



485

## SEQUENCE LISTING

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Toupet, Christine  
Engel, Nathalie

<120> Rifamycin biosynthesis gene cluster

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<400> 4

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  20               25              30

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Pro Gly Leu Ser Asp Gln Asp Arg Val Leu Trp Pro Leu Pro Leu Phe  
           35                                  40                                  45

His Ser Leu Ser His Ile Ala Cys Val Leu Ser Ala Thr Val Val Gly  
           50                                  55                                  60

Ala Ser Val Arg Ile Ala Asp Gly Ser Ser Ala Asp Asp Val Met Arg  
   65                                  70                                  75                                  80

Leu Ile Glu Ala Glu Ser Ser Thr Phe Leu Ala Gly Val Pro Thr Thr  
                                   85                                  90                                  95

Tyr His His Leu Val Arg Ala Ala Arg Gln Arg Gly Phe Ser Ala Pro  
                                   100                                  105                                  110

Ser Leu Arg Ile Gly Leu Ala Gly Gly Ala Val Leu Gly Ala Gly Leu  
           115                                  120                                  125

Arg Ser Glu Phe Glu Glu Thr Phe Gly Val Pro Leu Ile Asp Ala Tyr  
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Gly Ser Thr Glu Thr Cys Gly Ala Ile Thr Met Asn Pro Pro Asp Gly  
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                                   165                                  170                                  175

Arg Val Val Asp Pro Asp Thr Gly Leu Asp Val Pro Ala Gly Glu Glu  
                                   180                                  185                                  190

Gly Glu Val Trp Val Ser Gly Pro Asn Val Met Leu Gly Tyr His Asn  
           195                                  200                                  205

Ser Pro Glu Ala Thr Ala Ala Ala Met Arg Asp Gly Trp Phe Arg Thr  
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Gly Asp Leu Ala Arg Arg Asp Asp Ala Gly Tyr Phe Thr Ile Cys Gly  
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Arg Ile Lys Glu Leu Ile Ile Arg Gly Gly Ala Asn Ile His Pro Gly  
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Glu Val Glu Ala Val Leu Arg Thr Val Asp Gly Val Ala Asp Ala Ala  
           260                                  265                                  270

Val Gly Gly Val Pro His Asp Thr Leu Gly Glu Val Pro Val Ala Tyr  
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Val Ile Pro Gly Pro Thr Gly Phe Asp Pro Ala Ala Leu Ile Glu Lys  
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Cys Arg Glu Gln Leu Ser Ala Tyr Lys Val Pro Asp Arg Ile Leu Glu  
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Val Ala His Ile Pro Arg Thr Ala Ser Gly Lys Ile Arg Arg Gly Leu  
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Leu Thr Asp Glu Pro Ala Gln Leu Arg Tyr Ala Ala Thr Glu His Glu  
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Glu Gln Ser Arg His Ala Asp Glu Ser Val Ala Ala Ala Leu Arg Ala



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Pro Ile Ala Leu Lys Gly Thr Asp Thr Gly Val Phe Ser Gly Leu Met 580 585 590		
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 Thr Leu Pro Pro Thr Leu His Val Asp Lys Pro Thr Leu Glu Val Asp  
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                     1765                      1770                      1775

Ala Arg Leu Leu Asp Glu Leu Thr Arg Glu Ala Asp Leu Ala Ala Phe  
                     1780                      1785                      1790

Val Leu Phe Ser Ser Ala Ala Gly Val Leu Gly Asn Pro Gly Gln Ala  
                     1795                      1800                      1805

Gly Tyr Ala Ala Ala Asn Ala Glu Leu Asp Ala Leu Ala Arg Gln Arg  
                     1810                      1815                      1820

Asn Ser Leu Asp Leu Pro Ala Val Ser Ile Ala Trp Gly Tyr Trp Ala  
 1825                      1830                      1835                      1840

Thr Val Ser Gly Met Thr Glu His Leu Gly Asp Ala Asp Leu Arg Arg  
                     1845                      1850                      1855

Asn Gln Arg Ile Gly Met Ser Gly Leu Pro Ala Asp Glu Gly Met Ala  
                     1860                      1865                      1870

Leu Leu Asp Ala Ala Ile Ala Thr Gly Gly Thr Leu Val Ala Ala Lys  
                     1875                      1880                      1885

Phe Asp Val Ala Ala Leu Arg Ala Thr Ala Lys Ala Gly Gly Pro Val  
                     1890                      1895                      1900

Pro Pro Leu Leu Arg Gly Leu Ala Pro Leu Pro Arg Arg Ala Ala Ala  
 1905                      1910                      1915                      1920

Lys Thr Ala Ser Leu Thr Glu Arg Leu Ala Gly Leu Ala Glu Thr Glu  
                     1925                      1930                      1935

Gln Ala Ala Ala Leu Leu Asp Leu Val Arg Arg His Ala Ala Glu Val  
                     1940                      1945                      1950

Leu Gly His Ser Gly Ala Glu Ser Val His Ser Gly Arg Thr Phe Lys  
                     1955                      1960                      1965

Asp Ala Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu  
 1970                      1975                      1980

Ala Ala Ala Thr Gly Leu Thr Leu Ser Pro Ala Met Ile Phe Asp Tyr  
 1985 1990 1995 2000  
 Pro Lys Pro Pro Ala Leu Ala Asp His Leu Arg Ala Lys Leu Phe Gly  
 2005 2010 2015  
 Ser Ala Ala Asn Arg Pro Ala Glu Ile Gly Thr Ala Ala Ala Glu Glu  
 2020 2025 2030  
 Pro Ile Ala Ile Val Ala Met Ala Cys Arg Phe Pro Gly Gly Val His  
 2035 2040 2045  
 Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Asp Gly Ala Asp Ala Val  
 2050 2055 2060  
 Thr Glu Phe Pro Ala Asp Arg Gly Trp Asp Thr Asp Arg Leu Tyr His  
 2065 2070 2075 2080  
 Glu Asp Pro Asp His Glu Gly Thr Thr Tyr Val Arg His Gly Ala Phe  
 2085 2090 2095  
 Leu Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro  
 2100 2105 2110  
 Asn Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr  
 2115 2120 2125  
 Ser Trp Glu Leu Phe Glu Arg Ala Ala Ile Asp Pro Thr Thr Leu Ala  
 2130 2135 2140  
 Gly Gln Asp Ile Gly Val Phe Ala Gly Val Asn Ser His Asp Tyr Ser  
 2145 2150 2155 2160  
 Met Arg Met His Arg Ala Ala Gly Val Glu Gly Phe Arg Leu Thr Gly  
 2165 2170 2175  
 Gly Ser Ala Ser Val Leu Ser Gly Arg Val Ala Tyr His Phe Gly Val  
 2180 2185 2190  
 Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val  
 2195 2200 2205  
 Ala Leu His Met Ala Val Gln Ala Leu Gln Arg Gly Glu Cys Ser Met  
 2210 2215 2220  
 Ala Leu Ala Gly Gly Val Met Val Met Gly Thr Val Glu Thr Phe Val  
 2225 2230 2235 2240  
 Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ala  
 2245 2250 2255  
 Phe Ala Asp Gly Ala Asp Gly Thr Gly Trp Ser Glu Gly Val Gly Leu  
 2260 2265 2270  
 Leu Leu Val Glu Arg Leu Ser Glu Ala Gln Arg Arg Gly His Gln Val  
 2275 2280 2285  
 Leu Ala Val Val Arg Gly Ser Ala Val Asn Ser Asp Gly Ala Ser Asn  
 2290 2295 2300  
 Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Lys

2305	2310	2315	2320
Ala Leu Ala Ala Ala Gly Leu Ser Thr Ser Asp Val Asp Ala Val Glu			
2325	2330	2335	
Ala His Gly Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Glu Ala			
2340	2345	2350	
Leu Leu Ala Thr Tyr Gly Gln Asn Arg Glu Thr Pro Leu Trp Leu Gly			
2355	2360	2365	
Ser Val Lys Ser Asn Leu Gly His Thr Gln Ala Ala Ala Gly Val Ala			
2370	2375	2380	
Gly Val Ile Lys Met Val Met Ala Met Arg His Gly Val Leu Pro Arg			
2385	2390	2395	2400
Thr Leu His Val Asp Arg Pro Ser Ser Tyr Val Asp Trp Ser Ala Gly			
2405	2410	2415	
Ala Val Glu Leu Leu Thr Glu Ala Arg Asp Trp Val Ser Asn Gly His			
2420	2425	2430	
Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Gly Gly Thr Asn Ala			
2435	2440	2445	
His Val Val Leu Glu Glu Val Ala Ala Pro Ile Thr Thr Pro Gln Pro			
2450	2455	2460	
Glu Pro Ala Glu Phe Leu Val Pro Val Leu Val Ser Ala Arg Thr Ala			
2465	2470	2475	2480
Ala Gly Leu Arg Gly Gln Ala Gly Arg Leu Ala Ala Phe Leu Gly Asp			
2485	2490	2495	
Arg Thr Asp Val Arg Val Pro Asp Ala Ala Tyr Ala Leu Ala Thr Thr			
2500	2505	2510	
Arg Ala Gln Leu Asp His Arg Ala Val Val Leu Ala Ser Asp Arg Ala			
2515	2520	2525	
Gln Leu Cys Ala Asp Leu Ala Ala Phe Gly Ser Gly Val Val Thr Gly			
2530	2535	2540	
Thr Pro Val Asp Gly Lys Leu Ala Val Leu Phe Thr Gly Gln Gly Ser			
2545	2550	2555	2560
Gln Trp Ala Gly Met Gly Arg Glu Leu Ala Glu Thr Phe Pro Val Phe			
2565	2570	2575	
Arg Asp Ala Phe Glu Ala Ala Cys Glu Ala Val Asp Thr His Leu Arg			
2580	2585	2590	
Glu Arg Pro Leu Arg Glu Val Val Phe Asp Asp Ser Ala Leu Leu Asp			
2595	2600	2605	
Gln Thr Met Tyr Thr Gln Gly Ala Leu Phe Ala Val Glu Thr Ala Leu			
2610	2615	2620	
Phe Arg Leu Phe Glu Ser Trp Gly Val Arg Pro Gly Leu Leu Ala Gly			
2625	2630	2635	2640

His Ser Ile Gly Glu Leu Ala Ala Ala His Val Ser Gly Val Leu Asp  
                   2645                                  2650                                  2655

Leu Ala Asp Ala Gly Glu Leu Val Ala Ala Arg Gly Arg Leu Met Gln  
                   2660                                  2665                                  2670

Ala Leu Pro Ala Gly Gly Ala Met Val Ala Val Gln Ala Thr Glu Asp  
                   2675                                  2680                                  2685

Glu Val Ala Pro Leu Leu Asp Gly Thr Val Cys Val Ala Ala Val Asn  
                   2690                                  2695                                  2700

Gly Pro Asp Ser Val Val Leu Ser Gly Thr Glu Ala Ala Val Leu Ala  
 2705                                  2710                                  2715                                  2720

Val Ala Asp Glu Leu Ala Gly Arg Gly Arg Lys Thr Arg Arg Leu Ala  
                   2725                                  2730                                  2735

Val Ser His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Asp Asp  
                   2740                                  2745                                  2750

Phe Arg Ala Val Ala Glu Arg Leu Thr Tyr Arg Ala Gly Ser Leu Pro  
                   2755                                  2760                                  2765

Val Val Ser Thr Leu Thr Gly Glu Leu Ala Ala Leu Asp Ser Pro Asp  
                   2770                                  2775                                  2780

Tyr Trp Val Gly Gln Val Arg Asn Ala Val Arg Phe Ser Asp Ala Val  
 2785                                  2790                                  2795                                  2800

Thr Ala Leu Gly Ala Gln Gly Ala Ser Thr Phe Leu Glu Leu Gly Pro  
                   2805                                  2810                                  2815

Gly Gly Ala Leu Ala Ala Met Ala Leu Gly Thr Leu Gly Gly Pro Glu  
                   2820                                  2825                                  2830

Gln Ser Cys Val Ala Thr Leu Arg Lys Asn Gly Ala Glu Val Pro Asp  
                   2835                                  2840                                  2845

Val Leu Thr Ala Leu Ala Glu Leu His Val Arg Gly Val Gly Val Asp  
                   2850                                  2855                                  2860

Trp Thr Thr Val Leu Asp Glu Pro Ala Thr Ala Val Gly Thr Val Leu  
 2865                                  2870                                  2875                                  2880

Pro Thr Tyr Ala Phe Gln His Gln Arg Phe Trp Val Asp Val Asp Glu  
                   2885                                  2890                                  2895

Thr Ala Ala Val Ser Val Thr Pro Pro Pro Ala Glu Pro Ile Val Asp  
                   2900                                  2905                                  2910

Arg Pro Val Gln Asp Val Leu Glu Leu Val Arg Glu Ser Ala Ala Val  
                   2915                                  2920                                  2925

Val Leu Gly His Arg Asp Ala Gly Ser Phe Asp Leu Asp Arg Ser Phe  
                   2930                                  2935                                  2940

Lys Asp His Gly Phe Asp Ser Leu Ser Ala Val Lys Leu Arg Asn Arg  
 2945                                  2950                                  2955                                  2960



Leu Arg Asp Phe Thr Gly Val Glu Leu Pro Ser Thr Leu Ile Phe Asp  
 2965 2970 2975  
 Tyr Pro Asn Pro Ala Val Leu Ala Asp His Leu Arg Ala Glu Leu Leu  
 2980 2985 2990  
 Gly Glu Arg Pro Ala Ala Pro Ala Pro Val Thr Arg Asp Val Ser Asp  
 2995 3000 3005  
 Glu Pro Ile Ala Ile Val Gly Met Ser Thr Arg Leu Pro Gly Gly Ala  
 3010 3015 3020  
 Asp Ser Pro Glu Glu Leu Trp Lys Leu Val Ala Glu Gly Arg Asp Ala  
 3025 3030 3035 3040  
 Val Ser Gly Phe Pro Val Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr  
 3045 3050 3055  
 His Pro Asp Pro Ala His Ala Gly Thr Ser Tyr Thr Arg Ser Gly Gly  
 3060 3065 3070  
 Phe Leu His Asp Ala Ala Gln Phe Asp Ala Gly Leu Phe Gly Ile Ser  
 3075 3080 3085  
 Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu  
 3090 3095 3100  
 Thr Ser Trp Glu Ala Leu Glu Arg Ala Gly Val Asp Pro Leu Ser Ala  
 3105 3110 3115 3120  
 Arg Gly Ser Asp Val Gly Val Phe Thr Gly Ile Val His His Asp Tyr  
 3125 3130 3135  
 Val Thr Arg Leu Arg Glu Val Pro Glu Asp Val Gln Gly Tyr Thr Met  
 3140 3145 3150  
 Thr Gly Thr Ala Ser Ser Val Ala Ser Gly Arg Val Ala Tyr Val Phe  
 3155 3160 3165  
 Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser  
 3170 3175 3180  
 Leu Val Ala Met His Leu Ala Ala Gln Ala Leu Arg Gln Gly Glu Cys  
 3185 3190 3195 3200  
 Ser Met Ala Leu Ala Gly Gly Ala Thr Val Met Ala Ser Pro Asp Ala  
 3205 3210 3215  
 Phe Leu Glu Phe Ser Arg Gln Arg Gly Leu Ser Ala Asp Gly Arg Cys  
 3220 3225 3230  
 Lys Ala Tyr Ala Glu Gly Ala Asp Gly Thr Gly Trp Ala Glu Gly Val  
 3235 3240 3245  
 Gly Val Val Val Leu Glu Arg Leu Ser Val Ala Arg Glu Arg Gly His  
 3250 3255 3260  
 Arg Val Leu Ala Val Leu Arg Gly Ser Ala Val Asn Gln Asp Gly Ala  
 3265 3270 3275 3280  
 Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile

3285	3290	3295
Arg Gly Ala Leu Ala Ser Ala Gly Leu Ala Pro Ser Asp Val Asp Val 3300	3305	3310
Val Glu Gly His Gly Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu Val 3315	3320	3325
Gln Ala Leu Leu Ala Thr Tyr Gly Gln Glu Arg Glu Gln Pro Leu Trp 3330	3335	3340
Leu Gly Ser Leu Lys Ser Asn Leu Gly His Thr Gln Ala Ala Ala Gly 3345	3350	3355 3360
Val Val Gly Val Ile Lys Met Ile Met Ala Met Arg His Gly Val Met 3365	3370	3375
Pro Ala Thr Leu His Val Asp Glu Arg Thr Ser Gln Val Asp Trp Ser 3380	3385	3390
Ala Gly Ala Ile Glu Val Leu Thr Glu Ala Arg Glu Trp Pro Arg Thr 3395	3400	3405
Gly Arg Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Ala Ser Gly Thr 3410	3415	3420
Asn Ala His Leu Ile Ile Glu Glu Gly Pro Ala Glu Glu Ala Val Asp 3425	3430	3435 3440
Glu Glu Val Ala Ser Val Val Pro Leu Val Val Ser Ala Arg Ser Ala 3445	3450	3455
Gly Ser Leu Ala Gly Gln Ala Gly Arg Leu Ala Ala Val Leu Glu Asn 3460	3465	3470
Glu Ser Leu Ala Gly Val Ala Gly Ala Leu Val Ser Gly Arg Ala Thr 3475	3480	3485
Leu Asn Glu Arg Ala Val Val Ile Ala Gly Ser Arg Asp Glu Ala Gln 3490	3495	3500
Asp Gly Leu Gln Ala Leu Ala Arg Gly Glu Asn Ala Pro Gly Val Val 3505	3510	3515 3520
Thr Gly Thr Ala Gly Lys Pro Gly Lys Val Val Trp Val Phe Pro Gly 3525	3530	3535
Gln Gly Ser Gln Trp Met Gly Met Gly Arg Asp Leu Leu Asp Ser Ser 3540	3545	3550
Pro Val Phe Ala Ala Arg Ile Lys Glu Cys Ala Ala Ala Leu Glu Gln 3555	3560	3565
Trp Thr Asp Trp Ser Leu Leu Asp Val Leu Arg Gly Asp Ala Asp Leu 3570	3575	3580
Leu Asp Arg Val Asp Val Val Gln Pro Ala Ser Phe Ala Met Met Val 3585	3590	3595 3600
Gly Leu Ala Ala Val Trp Thr Ser Leu Gly Val Thr Pro Asp Ala Val 3605	3610	3615

Leu Gly His Ser Gln Gly Glu Ile Ala Ala Ala Cys Val Ser Gly Ala  
 3620 3625 3630

Leu Ser Leu Asp Asp Ala Ala Lys Val Val Ala Leu Arg Ser Gln Ala  
 3635 3640 3645

Ile Ala Gly Glu Leu Ala Gly Arg Gly Gly Met Ala Ser Val Ala Leu  
 3650 3655 3660

Ser Glu Glu Asp Ala Val Ala Arg Leu Thr Pro Trp Ala Asn Arg Val  
 3665 3670 3675 3680

Glu Val Ala Ala Val Asn Ser Pro Ser Ser Val Val Ile Ala Gly Asp  
 3685 3690 3695

Ala Gln Ala Leu Asp Glu Ala Leu Glu Ala Leu Ala Gly Asp Gly Val  
 3700 3705 3710

Arg Val Arg Arg Val Ala Val Asp Tyr Ala Ser His Thr Arg His Val  
 3715 3720 3725

Glu Ala Ile Ala Glu Thr Leu Ala Lys Thr Leu Ala Gly Ile Asp Ala  
 3730 3735 3740

Arg Val Pro Ala Ile Pro Phe Tyr Ser Thr Val Leu Gly Thr Trp Ile  
 3745 3750 3755 3760

Glu Gln Ala Val Val Asp Ala Gly Tyr Trp Tyr Arg Asn Leu Arg Gln  
 3765 3770 3775

Gln Val Arg Phe Gly Pro Ser Val Ala Asp Leu Ala Gly Leu Gly His  
 3780 3785 3790

Thr Val Phe Val Glu Ile Ser Ala His Pro Val Leu Val Gln Pro Leu  
 3795 3800 3805

Ser Glu Ile Ser Asp Asp Ala Val Val Thr Gly Ser Leu Arg Arg Asp  
 3810 3815 3820

Asp Gly Gly Leu Arg Arg Leu Leu Ala Ser Ala Ala Glu Leu Tyr Val  
 3825 3830 3835 3840

Arg Gly Val Ala Val Asp Trp Thr Ala Ala Val Pro Ala Ala Gly Trp  
 3845 3850 3855

Val Asp Leu Pro Thr Tyr Ala Phe Asp Arg Arg His Phe Trp Leu His  
 3860 3865 3870

Glu Ala Glu Thr Ala Glu Ala Ala Glu Gly Met Asp Gly Glu Phe Trp  
 3875 3880 3885

Thr Ala Ile Glu Gln Ser Asp Val Asp Ser Leu Ala Glu Leu Leu Glu  
 3890 3895 3900

Leu Val Pro Glu Gln Arg Gly Ala Leu Ser Thr Val Val Pro Val Leu  
 3905 3910 3915 3920

Ala Gln Trp Arg Asp Arg Arg Arg Glu Arg Ser Thr Ala Glu Lys Leu  
 3925 3930 3935

Arg Tyr Gln Val Thr Trp Gln Pro Leu Glu Arg Glu Ala Ala Gly Val  
 3940 3945 3950  
 Pro Gly Gly Arg Trp Leu Ala Val Val Pro Ala Gly Thr Thr Asp Ala  
 3955 3960 3965  
 Leu Leu Lys Glu Leu Thr Gly Gln Gly Leu Asp Ile Val Arg Leu Glu  
 3970 3975 3980  
 Ile Glu Glu Ala Ser Arg Ala Gln Leu Ala Glu Gln Leu Arg Asn Val  
 3985 3990 3995 4000  
 Leu Ala Glu His Asp Leu Thr Gly Val Leu Ser Leu Leu Ala Leu Asp  
 4005 4010 4015  
 Gly Gly Pro Ala Asp Ala Ala Glu Ile Thr Ala Ser Thr Leu Ala Leu  
 4020 4025 4030  
 Val Gln Ala Leu Gly Asp Thr Thr Thr Ser Ala Pro Leu Trp Cys Leu  
 4035 4040 4045  
 Thr Ser Gly Ala Val Asn Ile Gly Ile Gln Asp Ala Val Thr Ala Pro  
 4050 4055 4060  
 Ala Gln Ala Ala Val Trp Gly Leu Gly Arg Ala Val Ala Leu Glu Arg  
 4065 4070 4075 4080  
 Leu Asp Arg Trp Gly Gly Leu Val Asp Leu Pro Ala Ala Ile Asp Ala  
 4085 4090 4095  
 Arg Thr Ala Gln Ala Leu Leu Gly Val Leu Asn Gly Ala Ala Gly Glu  
 4100 4105 4110  
 Asp Gln Leu Ala Val Arg Arg Ser Gly Val Tyr Arg Arg Arg Leu Val  
 4115 4120 4125  
 Arg Lys Pro Val Pro Glu Ser Ala Thr Ser Arg Trp Glu Pro Arg Gly  
 4130 4135 4140  
 Thr Val Leu Val Thr Gly Gly Ala Glu Gly Leu Gly Arg His Ala Ser  
 4145 4150 4155 4160  
 Val Trp Leu Ala Gln Ser Gly Ala Glu Arg Leu Ile Val Thr Gly Thr  
 4165 4170 4175  
 Asp Gly Val Asp Glu Leu Thr Ala Glu Leu Ala Glu Phe Gly Thr Thr  
 4180 4185 4190  
 Val Glu Phe Cys Ala Asp Thr Asp Arg Asp Ala Ile Ala Gln Leu Val  
 4195 4200 4205  
 Ala Asp Ser Glu Val Thr Ala Val Val His Ala Ala Asp Ile Ala Gln  
 4210 4215 4220  
 Thr Ser Ser Val Asp Asp Thr Gly Val Ala Asp Leu Asp Glu Val Phe  
 4225 4230 4235 4240  
 Ala Ala Lys Val Thr Thr Ala Val Trp Leu Asp Gln Leu Phe Glu Asp  
 4245 4250 4255  
 Thr Pro Leu Asp Ala Phe Val Val Phe Ser Ser Ile Ala Gly Ile Trp

4260	4265	4270
Gly Gly Gly Gly Gln Gly Pro Ala Gly Ala Ala Asn Ala Val Leu Asp 4275	4280	4285
Ala Leu Val Glu Trp Arg Arg Ala Arg Gly Leu Lys Ala Thr Ser Ile 4290	4295	4300
Ala Trp Gly Ala Leu Asp Gln Ile Gly Ile Gly Met Asp Glu Ala Ala 4305	4310	4315 4320
Leu Ala Gln Leu Arg Arg Arg Gly Val Ile Pro Met Ala Pro Pro Leu 4325	4330	4335
Ala Val Thr Ala Met Val Gln Ala Val Ala Gly Asn Glu Lys Ala Val 4340	4345	4350
Ala Val Ala Asp Met Asp Trp Ala Ala Phe Ile Pro Ala Phe Thr Ser 4355	4360	4365
Val Arg Pro Ser Pro Leu Phe Ala Asp Leu Pro Glu Ala Lys Ala Ile 4370	4375	4380
Leu Arg Ala Ala Gln Asp Asp Gly Glu Asp Gly Asp Thr Ala Ser Ser 4385	4390	4395 4400
Leu Ala Asp Ser Leu Arg Ala Val Pro Asp Ala Glu Gln Asn Arg Ile 4405	4410	4415
Leu Leu Lys Leu Val Arg Gly His Ala Ser Thr Val Leu Gly His Ser 4420	4425	4430
Gly Ala Glu Gly Ile Gly Pro Arg Gln Ala Phe Gln Glu Val Gly Phe 4435	4440	4445
Asp Ser Leu Ala Ala Val Asn Leu Arg Asn Ser Leu His Ala Ala Thr 4450	4455	4460
Gly Leu Arg Leu Pro Ala Thr Leu Ile Phe Asp Tyr Pro Thr Pro Glu 4465	4470	4475 4480
Ala Leu Val Gly Tyr Leu Arg Val Glu Leu Leu Arg Glu Ala Asp Asp 4485	4490	4495
Gly Leu Asp Gly Arg Glu Asp Asp Leu Arg Arg Val Leu Ala Ala Val 4500	4505	4510
Pro Phe Ala Arg Phe Lys Glu Ala Gly Val Leu Asp Thr Leu Leu Gly 4515	4520	4525
Leu Ala Asp Thr Gly Thr Glu Pro Gly Thr Asp Ala Glu Thr Thr Glu 4530	4535	4540
Ala Ala Pro Ala Ala Asp Asp Ala Glu Leu Ile Asp Ala Leu Asp Ile 4545	4550	4555 4560
Ser Gly Leu Val Gln Arg Ala Leu Gly Gln Thr Ser 4565	4570	

&lt;211&gt; 5069

&lt;212&gt; PRT

<213> *Amycolatopsis mediterranei*

&lt;400&gt; 5

Met	Ala	Asn	Gln	Ser	Trp	Arg	Lys	Asn	Met	Ser	Ala	Pro	Asn	Glu	Gln	1	5	10	15
Ile	Val	Asp	Ala	Leu	Arg	Ala	Ser	Leu	Lys	Glu	Asn	Val	Arg	Leu	Gln	20	25	30	
Gln	Glu	Asn	Ser	Ala	Leu	Ala	Ala	Ala	Ala	Glu	Pro	Val	Ala	Ile	35	40	45		
Val	Ser	Met	Ala	Cys	Arg	Tyr	Ala	Gly	Gly	Ile	Arg	Gly	Pro	Glu	Asp	50	55	60	
Phe	Trp	Arg	Val	Val	Ser	Glu	Gly	Ala	Asp	Val	Tyr	Thr	Gly	Phe	Pro	65	70	75	80
Glu	Asp	Arg	Gly	Trp	Asp	Val	Glu	Gly	Leu	Tyr	His	Pro	Asp	Pro	Asp	85	90	95	
Asn	Pro	Gly	Thr	Thr	Tyr	Val	Arg	Glu	Gly	Ala	Phe	Leu	Gln	Asp	Ala	100	105	110	
Ala	Gln	Phe	Asp	Ala	Gly	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	115	120	125	
Ala	Met	Asp	Pro	Gln	Gln	Arg	Gln	Leu	Leu	Glu	Val	Ser	Trp	Glu	Thr	130	135	140	
Leu	Glu	Arg	Ala	Gly	Ile	Asp	Pro	His	Ser	Val	Arg	Gly	Ser	Asp	Ile	145	150	155	160
Gly	Val	Tyr	Ala	Gly	Val	Val	His	Gln	Asp	Tyr	Ala	Pro	Asp	Leu	Ser	165	170	175	
Gly	Phe	Glu	Gly	Phe	Met	Ser	Leu	Glu	Arg	Ala	Leu	Gly	Thr	Ala	Gly	180	185	190	
Gly	Val	Ala	Ser	Gly	Arg	Val	Ala	Tyr	Thr	Leu	Gly	Leu	Glu	Gly	Pro	195	200	205	
Ala	Val	Thr	Val	Asp	Thr	Met	Cys	Ser	Ser	Ser	Leu	Val	Ala	Ile	His	210	215	220	
Leu	Ala	Ala	Gln	Ala	Leu	Arg	Arg	Gly	Glu	Cys	Ser	Met	Ala	Leu	Ala	225	230	235	240
Gly	Gly	Ser	Thr	Val	Met	Ala	Thr	Pro	Gly	Gly	Phe	Val	Gly	Phe	Ala	245	250	255	
Arg	Gln	Arg	Ala	Leu	Ala	Phe	Asp	Gly	Arg	Cys	Lys	Ser	Tyr	Ala	Ala	260	265	270	
Ala	Ala	Asp	Gly	Ser	Gly	Trp	Ala	Glu	Gly	Val	Gly	Val	Leu	Leu	Leu	275	280	285	
Glu	Arg	Leu	Ser	Val	Ala	Arg	Glu	Arg	Gly	His	Gln	Val	Leu	Ala	Val	290	295	300	

Ile Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr			
305	310	315	320
Ala Pro Asn Gly Pro Ala Gln Gln Arg Val Ile Arg Lys Ala Leu Ala			
	325	330	335
Ser Ala Gly Leu Thr Pro Ser Asp Val Asp Thr Val Glu Gly His Gly			
	340	345	350
Thr Gly Thr Val Leu Gly Asp Pro Ile Glu Val Gln Ala Leu Leu Ala			
	355	360	365
Thr Tyr Gly Gln Gly Arg Asp Pro Gln Gln Pro Leu Trp Leu Gly Ser			
	370	375	380
Val Lys Ser Val Val Gly His Thr Gln Ala Ala Ser Gly Val Ala Gly			
385	390	395	400
Val Ile Lys Met Val Gln Ser Leu Arg His Gly Gln Leu Pro Ala Thr			
	405	410	415
Gln His Val Asp Ala Pro Thr Pro Gln Val Asp Trp Ser Ala Gly Ala			
	420	425	430
Ile Glu Leu Leu Ala Glu Gly Arg Glu Trp Pro Arg Asn Gly His Pro			
	435	440	445
Arg Arg Gly Gly Ile Ser Ser Phe Gly Ala Ser Gly Thr Asn Ala His			
	450	455	460
Met Ile Leu Glu Glu Ala Pro Glu Asp Glu Pro Val Thr Glu Ala Pro			
465	470	475	480
Ala Pro Thr Gly Val Val Pro Leu Val Val Ser Ala Ala Thr Ala Ala			
	485	490	495
Ser Leu Ala Ala Gln Ala Gly Arg Leu Ala Glu Val Gly Asp Val Ser			
	500	505	510
Leu Ala Asp Val Ala Gly Thr Leu Val Ser Gly Arg Ala Met Leu Ser			
	515	520	525
Glu Arg Ala Val Val Val Ala Gly Ser His Glu Glu Ala Val Thr Gly			
	530	535	540
Leu Arg Ala Leu Ala Arg Gly Glu Ser Ala Pro Gly Leu Leu Ser Gly			
545	550	555	560
Arg Gly Ser Gly Val Pro Gly Lys Val Val Trp Val Phe Pro Gly Gln			
	565	570	575
Gly Thr Gln Trp Ala Gly Met Gly Arg Glu Leu Leu Asp Ser Ser Glu			
	580	585	590
Val Phe Ala Ala Arg Ile Ala Glu Cys Glu Thr Ala Leu Gly Arg Trp			
	595	600	605
Val Asp Trp Ser Leu Thr Asp Val Leu Arg Gly Glu Ala Asp Leu Leu			
	610	615	620

Asp	Arg	Val	Asp	Val	Val	Gln	Pro	Ala	Ser	Phe	Ala	Val	Met	Val	Gly	
625						630				635					640	
Leu	Ala	Ala	Val	Trp	Ala	Ser	Leu	Gly	Val	Glu	Pro	Glu	Ala	Val	Val	
				645					650						655	
Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	Cys	Val	Ser	Gly	Ala	Leu	
			660					665					670			
Ser	Leu	Glu	Asp	Ala	Ala	Lys	Val	Val	Ala	Leu	Arg	Ser	Gln	Ala	Ile	
		675					680					685				
Ala	Ala	Ser	Leu	Ala	Gly	Arg	Gly	Gly	Met	Ala	Ser	Val	Ala	Leu	Ser	
		690				695						700				
Glu	Glu	Asp	Ala	Thr	Ala	Arg	Leu	Glu	Pro	Trp	Ala	Gly	Arg	Val	Glu	
705					710					715					720	
Val	Ala	Ala	Val	Asn	Gly	Pro	Thr	Ser	Val	Val	Ile	Ala	Gly	Asp	Ala	
				725					730					735		
Glu	Ala	Leu	Asp	Glu	Ala	Leu	Asp	Ala	Leu	Asp	Asp	Gln	Gly	Val	Arg	
			740					745					750			
Ile	Arg	Arg	Val	Ala	Val	Asp	Tyr	Ala	Ser	His	Thr	Arg	His	Val	Glu	
		755					760					765				
Ala	Ala	Arg	Asp	Ala	Leu	Ala	Glu	Met	Leu	Gly	Gly	Ile	Arg	Ala	Gln	
		770				775					780					
Ala	Pro	Glu	Val	Pro	Phe	Tyr	Ser	Thr	Val	Thr	Gly	Gly	Trp	Val	Glu	
785					790					795					800	
Asp	Ala	Gly	Val	Leu	Asp	Gly	Gly	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	Arg	
				805					810					815		
Gln	Val	Arg	Phe	Gly	Pro	Ala	Val	Ala	Glu	Leu	Ile	Glu	Gln	Gly	His	
			820					825					830			
Arg	Val	Phe	Val	Glu	Val	Ser	Ala	His	Pro	Val	Leu	Val	Gln	Pro	Ile	
		835					840						845			
Asn	Glu	Leu	Val	Asp	Asp	Thr	Glu	Ala	Val	Val	Thr	Gly	Thr	Leu	Arg	
	850					855					860					
Arg	Glu	Asp	Gly	Gly	Leu	Arg	Arg	Leu	Leu	Ala	Ser	Ala	Ala	Glu	Leu	
865					870					875					880	
Phe	Val	Arg	Gly	Val	Thr	Val	Asp	Trp	Ser	Gly	Val	Leu	Pro	Pro	Ser	
				885					890					895		
Arg	Arg	Val	Glu	Leu	Pro	Thr	Tyr	Ala	Phe	Asp	His	Gln	His	Tyr	Trp	
			900					905					910			
Leu	Gln	Met	Gly	Gly	Ser	Ala	Thr	Asp	Ala	Val	Ser	Leu	Gly	Leu	Ala	
		915					920					925				
Gly	Ala	Asp	His	Pro	Leu	Leu	Gly	Ala	Val	Val	Pro	Leu	Pro	Gln	Ser	
		930				935					940					
Asp	Gly	Leu	Val	Phe	Thr	Ser	Arg	Leu	Ser	Leu	Lys	Ser	His	Pro	Trp	



945	950	955	960
Leu Ala Gly His	Ala Ile Gly Gly Val	Val Leu Ile Pro Gly Thr	Val
	965	970	975
Tyr Val Asp	Leu Ala Leu Arg Ala	Gly Asp Glu Leu Gly Phe	Gly Val
	980	985	990
Leu Glu Glu	Leu Val Ile Glu Ala	Pro Leu Val Leu Gly Glu	Arg Gly
	995	1000	1005
Gly Val Arg	Val Gln Val Ala Val	Ser Gly Pro Asn Glu Thr	Gly Ser
	1010	1015	1020
Arg Ala Val	Asp Val Phe Ser Met	Arg Glu Asp Gly Asp Glu	Trp Thr
	1025	1030	1035
Arg His Ala	Thr Gly Leu Leu Gly	Ala Ser Thr Ser Arg	Glu Pro Ser
	1045	1050	1055
Arg Phe Asp	Phe Ala Ala Trp Pro	Pro Ala Gly Ala Glu	Pro Ile Asp
	1060	1065	1070
Val Glu Asn	Phe Tyr Thr Asp Leu	Thr Glu Arg Gly Tyr	Ala Tyr Ser
	1075	1080	1085
Gly Ala Phe	Gln Gly Met Arg Ala	Val Trp Arg Arg Gly	Asp Glu Val
	1090	1095	1100
Phe Ala Glu	Val Ala Leu Pro Asp	Asp His Arg Glu Asp	Ala Gly Lys
	1105	1110	1115
Phe Gly Leu	His Pro Ala Leu Leu	Asp Ala Leu His Thr	Asn Ala
	1125	1130	1135
Phe Ala Asn	Pro Asp Asp Asp Arg	Ser Val Leu Pro Phe	Ala Trp Asn
	1140	1145	1150
Gly Leu Val	Leu His Ala Val Gly	Ala Ser Ala Leu Arg	Val Arg Val
	1155	1160	1165
Ala Pro Gly	Gly Pro Asp Ala Leu	Thr Phe Gln Ala Ala	Asp Glu Thr
	1170	1175	1180
Gly Gly Leu	Val Val Thr Met Asp	Ser Leu Val Ser Arg	Glu Val Ser
	1185	1190	1195
Ala Ala Gln	Leu Glu Thr Ala Ala	Gly Glu Glu Arg Asp	Ser Leu Phe
	1205	1210	1215
Gln Val Asp	Trp Ile Glu Val Pro	Ala Thr Glu Thr Ala	Ala Thr Glu
	1220	1225	1230
His Ala Glu	Val Leu Glu Ala Phe	Gly Glu Ala Ala Pro	Leu Glu Leu
	1235	1240	1245
Thr Ser Arg	Val Leu Glu Ala Val	Gln Ser Trp Leu Ala	Asp Ala Ala
	1250	1255	1260
Asp Glu Ala	Arg Leu Val Val Val	Thr Arg Gly Ala Val	Arg Glu Val
	1265	1270	1275
			1280

Thr Asp Pro Ala Gly Ala Ala Val Trp Gly Leu Val Arg Ala Ala Gln  
 1285 1290 1295  
 Ala Glu Asn Pro Gly Arg Ile Ile Leu Val Asp Thr Asp Gly Asp Val  
 1300 1305 1310  
 Pro Leu Gly Ala Val Leu Ala Ser Gly Glu Pro Gln Leu Ala Val Arg  
 1315 1320 1325  
 Gly Asn Ala Phe Ser Val Pro Arg Leu Ala Arg Ala Thr Gly Glu Val  
 1330 1335 1340  
 Pro Glu Ala Pro Ala Val Phe Ser Pro Glu Gly Thr Val Leu Leu Thr  
 1345 1350 1355 1360  
 Gly Gly Thr Gly Ser Leu Gly Gly Leu Val Ala Lys His Leu Val Ala  
 1365 1370 1375  
 Arg His Gly Val Arg Arg Leu Val Leu Ala Ser Arg Arg Gly Val Ala  
 1380 1385 1390  
 Ala Glu Asp Leu Val Thr Glu Leu Thr Glu Gln Gly Ala Thr Val Ser  
 1395 1400 1405  
 Val Val Ala Cys Asp Val Ser Asp Arg Asp Gln Val Ala Ala Leu Leu  
 1410 1415 1420  
 Ala Glu His Arg Pro Thr Gly Ile Val His Leu Ala Gly Leu Leu Asp  
 1425 1430 1435 1440  
 Asp Gly Val Ile Gly Ala Leu Asn Arg Glu Arg Leu Ala Gly Val Phe  
 1445 1450 1455  
 Ala Pro Lys Val Asp Ala Val Gln His Leu Asp Glu Leu Thr Arg Asp  
 1460 1465 1470  
 Leu Gly Leu Asp Ala Phe Val Val Phe Ser Ser Ala Ala Ala Leu Met  
 1475 1480 1485  
 Gly Ser Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp  
 1490 1495 1500  
 Gly Leu Met Ala Gly Arg Arg Ala Ala Gly Leu Pro Gly Val Ser Leu  
 1505 1510 1515 1520  
 Ala Trp Gly Leu Trp Glu Gln Ala Asp Gly Leu Thr Ala Asn Leu Ser  
 1525 1530 1535  
 Ala Thr Asp Gln Ala Arg Met Ser Arg Gly Gly Val Leu Pro Met Thr  
 1540 1545 1550  
 Pro Ala Glu Ala Leu Asp Ile Phe Asp Ile Gly Leu Ala Ala Glu Gln  
 1555 1560 1565  
 Ala Leu Leu Val Pro Ile Lys Leu Asp Leu Arg Thr Leu Arg Gly Gln  
 1570 1575 1580  
 Ala Thr Ala Gly Gly Glu Val Pro His Leu Leu Arg Gly Leu Val Arg  
 1585 1590 1595 1600

Ala Ser Arg Arg Val Thr Arg Thr Ala Ala Ala Ser Gly Gly Gly Gly  
 1605 1610 1615  
 Leu Val His Lys Leu Ala Gly Arg Pro Ala Glu Glu Gln Glu Ala Val  
 1620 1625 1630  
 Leu Leu Gly Ile Val Gln Ala Glu Ala Ala Ala Val Leu Gly Phe Asn  
 1635 1640 1645  
 Ala Pro Glu Leu Ala Gln Gly Thr Arg Gly Phe Ser Asp Leu Gly Phe  
 1650 1655 1660  
 Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Ser Ala Ala Thr  
 1665 1670 1675 1680  
 Gly Val Lys Leu Pro Ala Thr Leu Val Phe Asp Tyr Pro Thr Pro Val  
 1685 1690 1695  
 Ala Leu Ala Arg His Leu Arg Glu Glu Leu Gly Glu Thr Val Ala Gly  
 1700 1705 1710  
 Ala Pro Ala Thr Pro Val Thr Thr Val Ala Asp Ala Gly Glu Pro Ile  
 1715 1720 1725  
 Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly Gly Val Met Ser Pro  
 1730 1735 1740  
 Asp Asp Leu Trp Arg Met Val Ala Glu Gly Arg Asp Gly Met Ser Pro  
 1745 1750 1755 1760  
 Phe Pro Gly Asp Arg Gly Trp Asp Leu Asp Gly Leu Phe Asp Ser Asp  
 1765 1770 1775  
 Pro Glu Arg Pro Gly Thr Ala Tyr Ile Arg Gln Gly Gly Phe Leu His  
 1780 1785 1790  
 Glu Ala Ala Leu Phe Asp Pro Gly Phe Phe Gly Ile Ser Pro Arg Glu  
 1795 1800 1805  
 Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp  
 1810 1815 1820  
 Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Thr Lys Ala Arg Gly Asp  
 1825 1830 1835 1840  
 Ala Val Gly Val Phe Ser Gly Val Ser Ile His Asp Tyr Leu Glu Ser  
 1845 1850 1855  
 Leu Ser Asn Met Pro Ala Glu Leu Glu Gly Phe Val Thr Thr Ala Thr  
 1860 1865 1870  
 Ala Gly Ser Val Ala Ser Gly Arg Val Ser Tyr Thr Phe Gly Phe Glu  
 1875 1880 1885  
 Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala  
 1890 1895 1900  
 Ile His Leu Ala Ala Gln Ala Leu Arg Gln Gly Glu Cys Thr Met Ala  
 1905 1910 1915 1920  
 Leu Ala Gly Gly Val Ala Val Met Gly Ser Pro Ile Gly Val Ile Gly

1925	1930	1935
Met Ser Arg Gln Arg Gly Met Ala Glu Asp Gly Arg Val Lys Ala Phe 1940 1945 1950		
Ala Asp Gly Ala Asp Gly Thr Val Leu Ser Glu Gly Val Gly Ile Val 1955 1960 1965		
Val Leu Glu Arg Leu Ser Val Ala Arg Glu Arg Gly His Arg Val Leu 1970 1975 1980		
Ala Val Leu Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly 1985 1990 1995 2000		
Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Ser Ala 2005 2010 2015		
Leu Ala Gly Ala Gly Leu Gln Pro Ser Glu Val Asp Val Val Glu Ala 2020 2025 2030		
His Gly Thr Gly Thr Ala Leu Gly Glu Pro Ile Glu Ala Gln Ala Leu 2035 2040 2045		
Leu Ala Thr Tyr Gly Lys Ser Arg Glu Thr Pro Leu Trp Leu Gly Ser 2050 2055 2060		
Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Ala 2065 2070 2075 2080		
Val Ile Lys Met Val Gln Ala Leu Arg Gln Asp Thr Leu Pro Pro Thr 2085 2090 2095		
Leu His Val Gln Glu Pro Thr Lys Gln Val Asp Trp Ser Ala Gly Ala 2100 2105 2110		
Val Glu Leu Leu Thr Glu Gly Arg Glu Trp Ala Arg Asn Gly His Pro 2115 2120 2125		
Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His 2130 2135 2140		
Leu Ile Leu Glu Glu Ala Pro Ala Asp Asp Thr Ala Glu Ala Asp Val 2145 2150 2155 2160		
Pro Asp Ala Val Val Pro Val Val Ile Ser Ala Arg Ser Thr Gly Ser 2165 2170 2175		
Leu Ala Gly Gln Ala Gly Arg Leu Ala Ala Phe Leu Asp Gly Asp Val 2180 2185 2190		
Pro Leu Thr Arg Val Ala Gly Ala Leu Leu Ser Thr Arg Ala Thr Leu 2195 2200 2205		
Thr Asp Arg Ala Val Val Val Ala Gly Ser Ala Glu Glu Ala Arg Ala 2210 2215 2220		
Gly Leu Thr Ala Leu Ala Arg Gly Glu Ser Ala Ser Gly Leu Val Thr 2225 2230 2235 2240		
Gly Thr Ala Gly Met Pro Gly Lys Thr Val Trp Val Phe Pro Gly Gln 2245 2250 2255		

Gly Thr Gln Trp Ala Gly Met Gly Arg Glu Leu Leu Glu Ala Ser Pro  
 2260 2265 2270  
 Val Phe Ala Glu Arg Ile Glu Glu Cys Ala Ala Ala Leu Gln Pro Trp  
 2275 2280 2285  
 Ile Asp Trp Ser Leu Leu Asp Val Leu Arg Gly Glu Gly Glu Leu Asp  
 2290 2295 2300  
 Arg Val Asp Val Leu Gln Pro Ala Cys Phe Ala Val Met Val Gly Leu  
 2305 2310 2315 2320  
 Ala Ala Val Trp Ala Ser Val Gly Val Val Pro Asp Ala Val Leu Gly  
 2325 2330 2335  
 His Ser Gln Gly Glu Ile Ala Ala Ala Cys Val Ser Gly Ala Leu Ser  
 2340 2345 2350  
 Leu Glu Asp Ala Ala Lys Val Val Ala Leu Arg Ser Gln Ala Ile Ala  
 2355 2360 2365  
 Ala Glu Leu Ser Gly Arg Gly Gly Met Ala Ser Ile Gln Leu Ser His  
 2370 2375 2380  
 Asp Glu Val Ala Ala Arg Leu Ala Pro Trp Ala Gly Arg Val Glu Ile  
 2385 2390 2395 2400  
 Ala Ala Val Asn Gly Pro Ala Ser Val Val Ile Ala Gly Asp Ala Glu  
 2405 2410 2415  
 Ala Leu Thr Glu Ala Val Glu Val Leu Gly Gly Arg Arg Val Ala Val  
 2420 2425 2430  
 Asp Tyr Ala Ser His Thr Arg His Val Glu Asp Ile Gln Asp Thr Leu  
 2435 2440 2445  
 Ala Glu Thr Leu Ala Gly Ile Asp Ala Gln Ala Pro Val Val Pro Phe  
 2450 2455 2460  
 Tyr Ser Thr Val Ala Gly Glu Trp Ile Thr Asp Ala Gly Val Val Asp  
 2465 2470 2475 2480  
 Gly Gly Tyr Trp Tyr Arg Asn Leu Arg Asn Gln Val Gly Phe Gly Pro  
 2485 2490 2495  
 Ala Val Ala Glu Leu Ile Glu Gln Gly His Gly Val Phe Val Glu Val  
 2500 2505 2510  
 Ser Ala His Pro Val Leu Val Gln Pro Ile Ser Glu Leu Thr Asp Ala  
 2515 2520 2525  
 Val Val Thr Gly Thr Leu Arg Arg Asp Asp Gly Gly Val Arg Arg Leu  
 2530 2535 2540  
 Leu Thr Ser Met Ala Glu Leu Phe Val Arg Gly Val Pro Val Asp Trp  
 2545 2550 2555 2560  
 Ala Thr Met Ala Pro Pro Ala Arg Val Glu Leu Pro Thr Tyr Ala Phe  
 2565 2570 2575

Asp His Gln His Phe Trp Leu Ser Pro Pro Ala Val Ala Asp Ala Pro  
 2580 2585 2590

Ala Leu Gly Leu Ala Gly Ala Asp His Pro Leu Leu Gly Ala Val Leu  
 2595 2600 2605

Pro Leu Pro Gln Ser Asp Gly Leu Val Phe Thr Ser Arg Leu Ser Val  
 2610 2615 2620

Arg Thr His Pro Trp Leu Ala Asp Gly Val Pro Ala Ala Ala Leu Val  
 2625 2630 2635 2640

Glu Leu Ala Val Arg Ala Gly Asp Glu Ala Gly Cys Pro Val Leu Ala  
 2645 2650 2655

Asp Leu Thr Val Glu Lys Leu Leu Val Leu Pro Glu Ser Gly Gly Leu  
 2660 2665 2670

Arg Val Gln Val Ile Val Ser Gly Glu Arg Thr Val Glu Val Tyr Ser  
 2675 2680 2685

Gln Leu Glu Gly Ala Glu Asp Trp Ile Arg Asn Ala Thr Gly His Leu  
 2690 2695 2700

Ser Ala Thr Ala Pro Ala His Glu Ala Phe Asp Phe Thr Ala Trp Pro  
 2705 2710 2715 2720

Pro Ala Gly Ala Gln Gln Val Asp Gly Leu Trp Arg Arg Gly Asp Glu  
 2725 2730 2735

Ile Phe Ala Glu Val Ala Leu Pro Glu Glu Leu Asp Ala Gly Ala Phe  
 2740 2745 2750

Gly Ile His Pro Phe Leu Leu Asp Ala Ala Val Gln Pro Val Leu Ala  
 2755 2760 2765

Asp Asp Glu Gln Pro Ala Glu Trp Arg Ser Leu Val Leu His Ala Ala  
 2770 2775 2780

Gly Ala Ser Ala Leu Arg Val Arg Leu Val Pro Gly Gly Ala Leu Gln  
 2785 2790 2795 2800

Ala Ala Asp Glu Thr Gly Gly Leu Val Leu Thr Ala Asp Ser Val Ala  
 2805 2810 2815

Gly Arg Glu Leu Ser Ala Gly Lys Thr Arg Ala Gly Ser Leu Tyr Arg  
 2820 2825 2830

Val Asp Trp Thr Glu Val Ser Ile Ala Asp Ser Ala Val Pro Ala Asn  
 2835 2840 2845

Ile Glu Val Val Glu Ala Phe Gly Glu Glu Pro Leu Glu Leu Thr Gly  
 2850 2855 2860

Arg Val Leu Glu Ala Val Gln Thr Trp Leu Val Thr Ala Ala Asp Asp  
 2865 2870 2875 2880

Ala Arg Leu Val Val Val Thr Arg Gly Ala Val Arg Glu Val Thr Asp  
 2885 2890 2895

Pro Ala Gly Ala Ala Val Trp Gly Leu Val Arg Ala Ala Gln Ala Glu

2900	2905	2910
Asn Pro Gly Arg Ile Phe Leu Ile Asp Thr Asp Gly Glu Ile Pro Ala 2915	2920	2925
Leu Thr Gly Asp Glu Pro Glu Ile Ala Val Arg Gly Gly Lys Phe Phe 2930	2935	2940
Val Pro Arg Ile Thr Arg Ala Glu Pro Ser Gly Ala Ala Val Phe Arg 2945	2950	2955 2960
Pro Asp Gly Thr Val Leu Ile Ser Gly Ala Gly Ala Leu Gly Gly Leu 2965	2970	2975
Val Ala Arg Arg Leu Val Glu Arg His Gly Val Arg Lys Leu Val Leu 2980	2985	2990
Ala Ser Arg Arg Gly Arg Asp Ala Asp Gly Val Ala Asp Leu Val Ala 2995	3000	3005
Asp Leu Ala Ala Asp Val Ser Val Val Ala Cys Asp Val Ser Asp Arg 3010	3015	3020
Ala Gln Val Ala Ala Leu Leu Asp Glu His Arg Pro Thr Ala Val Val 3025	3030	3035 3040
His Thr Ala Gly Val Ile Asp Ala Gly Val Ile Glu Thr Leu Asp Arg 3045	3050	3055
Asp Arg Leu Ala Thr Val Phe Ala Pro Lys Val Asp Ala Val Arg His 3060	3065	3070
Leu Asp Glu Leu Thr Arg Asp Arg Asp Leu Asp Ala Phe Val Val Tyr 3075	3080	3085
Ser Ser Val Ser Ala Val Phe Met Gly Ala Gly Ser Gly Ser Tyr Ala 3090	3095	3100
Ala Ala Asn Ala Phe Leu Asp Gly Leu Met Ala Asn Arg Arg Ala Ala 3105	3110	3115 3120
Gly Leu Pro Gly Leu Ser Leu Ala Trp Gly Leu Trp Asp Gln Ser Thr 3125	3130	3135
Gly Met Ala Ala Gly Thr Asp Glu Ala Thr Arg Ala Arg Met Ser Arg 3140	3145	3150
Arg Gly Gly Leu Gln Ile Met Thr Gln Ala Glu Gly Met Asp Leu Phe 3155	3160	3165
Asp Ala Ala Leu Ser Ser Ala Glu Ser Leu Leu Val Pro Ala Lys Leu 3170	3175	3180
Asp Leu Arg Gly Val Arg Ala Asp Ala Ala Ala Gly Gly Val Val Pro 3185	3190	3195 3200
His Met Leu Arg Gly Leu Val Arg Ala Gly Arg Ala Gln Ala Arg Ala 3205	3210	3215
Ala Ser Thr Val Asp Asn Gly Leu Ala Gly Arg Leu Ala Gly Leu Ala 3220	3225	3230

Pro Ala Asp Gln Leu Thr Leu Leu Leu Asp Leu Val Arg Ala Gln Val  
 3235 3240 3245  
 Ala Ala Val Leu Gly His Ala Asp Ala Ser Ala Val Arg Val Asp Thr  
 3250 3255 3260  
 Ala Phe Lys Asp Ala Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg  
 3265 3270 3275 3280  
 Asn Arg Met Arg Thr Ala Thr Gly Leu Lys Leu Pro Ala Thr Leu Val  
 3285 3290 3295  
 Phe Asp Tyr Pro Asn Pro Gln Ala Leu Ala Arg His Leu Arg Asp Glu  
 3300 3305 3310  
 Leu Gly Gly Ala Ala Gln Thr Pro Val Thr Thr Ala Ala Ala Lys Ala  
 3315 3320 3325  
 Asp Leu Asp Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg Leu Pro  
 3330 3335 3340  
 Gly Gly Val Ala Gly Pro Glu Asp Leu Trp Arg Leu Val Ala Glu Gly  
 3345 3350 3355 3360  
 Arg Asp Ala Val Ser Ser Phe Pro Thr Asp Arg Gly Trp Asp Thr Asp  
 3365 3370 3375  
 Ser Leu Tyr Asp Pro Asp Pro Ala Arg Pro Gly Lys Thr Tyr Thr Arg  
 3380 3385 3390  
 His Gly Gly Phe Leu His Glu Ala Gly Leu Phe Asp Ala Gly Phe Phe  
 3395 3400 3405  
 Gly Ile Ser Pro Arg Glu Ala Val Ala Met Asp Pro Gln Gln Arg Leu  
 3410 3415 3420  
 Leu Leu Glu Ala Ser Trp Glu Ala Met Glu Asp Ala Gly Val Asp Pro  
 3425 3430 3435 3440  
 Leu Ser Leu Lys Gly Asn Asp Val Gly Val Phe Thr Gly Met Phe Gly  
 3445 3450 3455  
 Gln Gly Tyr Val Ala Pro Gly Asp Ser Val Val Thr Pro Glu Leu Glu  
 3460 3465 3470  
 Gly Phe Ala Gly Thr Gly Gly Ser Ser Ser Val Ala Ser Gly Arg Val  
 3475 3480 3485  
 Ser Tyr Val Phe Gly Phe Glu Gly Pro Ala Val Thr Ile Asp Ser Ala  
 3490 3495 3500  
 Cys Ser Ser Ser Leu Val Ala Met His Leu Ala Ala Gln Ser Leu Arg  
 3505 3510 3515 3520  
 Gln Gly Glu Cys Ser Met Ala Leu Ala Gly Gly Ala Thr Val Met Ala  
 3525 3530 3535  
 Asn Pro Gly Ala Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Val  
 3540 3545 3550



Asp Gly Arg Cys Lys Ala Phe Ala Ala Ala Asp Gly Thr Gly Trp  
 3555 3560 3565  
 Ala Glu Gly Val Gly Val Val Ile Leu Glu Arg Leu Ser Val Ala Arg  
 3570 3575 3580  
 Glu Arg Gly His Arg Ile Leu Ala Val Leu Arg Gly Ser Ala Val Asn  
 3585 3590 3595 3600  
 Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln  
 3605 3610 3615  
 Gln Arg Val Ile Arg Arg Ala Leu Val Ser Ala Gly Leu Ala Pro Ser  
 3620 3625 3630  
 Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly Asp  
 3635 3640 3645  
 Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Lys Asp Arg Glu  
 3650 3655 3660  
 Ser Pro Leu Trp Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln  
 3665 3670 3675 3680  
 Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg  
 3685 3690 3695  
 His Glu Val Leu Pro Pro Thr Leu His Val Asp Arg Pro Thr Pro Glu  
 3700 3705 3710  
 Val Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Glu Ala Arg Glu  
 3715 3720 3725  
 Trp Pro Arg Asn Gly Arg Pro Arg Arg Ala Gly Val Ser Ala Phe Gly  
 3730 3735 3740  
 Val Ser Gly Thr Asn Ala His Leu Ile Leu Glu Glu Ala Pro Ala Glu  
 3745 3750 3755 3760  
 Glu Pro Val Pro Thr Pro Glu Val Pro Leu Val Pro Val Val Val Ser  
 3765 3770 3775  
 Ala Arg Ser Arg Ala Ser Leu Ala Gly Gln Ala Gly Arg Leu Ala Gly  
 3780 3785 3790  
 Phe Val Ala Gly Asp Ala Ser Leu Ala Gly Val Ala Arg Ala Leu Val  
 3795 3800 3805  
 Thr Asn Arg Ala Ala Leu Thr Glu Arg Ala Val Met Val Val Gly Ser  
 3810 3815 3820  
 Arg Glu Glu Ala Val Thr Asn Leu Glu Ala Leu Ala Arg Gly Glu Asp  
 3825 3830 3835 3840  
 Pro Ala Ala Val Val Thr Gly Arg Ala Gly Ser Pro Gly Lys Leu Val  
 3845 3850 3855  
 Trp Val Phe Pro Gly Gln Gly Ser Gln Trp Ile Gly Met Gly Arg Glu  
 3860 3865 3870  
 Leu Leu Asp Ser Ser Pro Val Phe Ala Glu Arg Val Ala Glu Cys Ala

3875	3880	3885
Ala Ala Leu Glu Pro Trp Ile Asp Trp Ser Leu Leu Asp Val Leu Arg 3890	3895	3900
Gly Glu Ser Asp Leu Leu Asp Arg Val Asp Val Val Gln Pro Ala Ser 3905	3910	3915 3920
Phe Ala Met Met Val Gly Leu Ala Ala Val Trp Gln Ser Val Gly Val 3925	3930	3935
Arg Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala 3940	3945	3950
Cys Val Ser Gly Ala Leu Ser Leu Gln Asp Ala Ala Lys Val Val Ala 3955	3960	3965
Leu Arg Ser Gln Ala Ile Ala Thr Arg Leu Ala Gly Arg Gly Gly Met 3970	3975	3980
Ala Ser Val Ala Leu Ser Glu Glu Asp Ala Thr Ala Trp Leu Ala Pro 3985	3990	3995 4000
Trp Ala Asp Arg Val Gln Val Ala Ala Val Asn Ser Pro Ala Ser Val 4005	4010	4015
Val Ile Ala Gly Glu Ala Gln Ala Leu Asp Glu Val Val Asp Ala Leu 4020	4025	4030
Ser Gly Gln Glu Val Arg Val Arg Arg Val Ala Val Asp Tyr Gly Ser 4035	4040	4045
His Thr Asn Gln Val Glu Ala Ile Glu Asp Leu Leu Ala Glu Thr Leu 4050	4055	4060
Ala Gly Ile Glu Ala Gln Ala Pro Lys Val Pro Phe Tyr Ser Thr Leu 4065	4070	4075 4080
Ile Gly Asp Trp Ile Arg Asp Ala Gly Ile Val Asp Gly Gly Tyr Trp 4085	4090	4095
Tyr Arg Asn Leu Arg Asn Gln Val Gly Phe Gly Pro Ala Val Ala Glu 4100	4105	4110
Leu Val Arg Gln Gly His Gly Val Phe Val Glu Val Ser Ala His Pro 4115	4120	4125
Val Leu Val Gln Pro Leu Ser Glu Leu Ser Asp Asp Ala Val Val Thr 4130	4135	4140
Gly Ser Leu Arg Arg Glu Asp Gly Gly Leu Arg Arg Leu Leu Thr Ser 4145	4150	4155 4160
Met Ala Glu Leu Tyr Val Gln Gly Val Pro Leu Asp Trp Thr Ala Val 4165	4170	4175
Leu Pro Arg Thr Gly Arg Val Asp Leu Pro Lys Tyr Ala Phe Asp His 4180	4185	4190
Arg His Tyr Trp Leu Arg Pro Ala Glu Ser Ala Thr Asp Ala Ala Ser 4195	4200	4205

Leu Gly Gln Ala Ala Ala Asp His Pro Leu Leu Gly Ala Val Val Glu  
 4210 4215 4220  
 Leu Pro Gln Ser Asp Gly Leu Val Phe Thr Ser Arg Leu Ser Val Arg  
 4225 4230 4235 4240  
 Thr His Pro Trp Leu Ala Asp His Ala Val Gly Gly Val Val Ile Leu  
 4245 4250 4255  
 Pro Gly Ser Gly Leu Ala Glu Leu Ala Val Arg Ala Gly Asp Glu Ala  
 4260 4265 4270  
 Gly Cys Thr Ala Leu Asp Glu Leu Ile Ile Glu Ala Pro Leu Val Val  
 4275 4280 4285  
 Pro Ala Gln Gly Ala Val Arg Val Gln Val Ala Leu Ser Gly Pro Asp  
 4290 4295 4300  
 Glu Thr Gly Ser Arg Thr Val Asp Leu Tyr Ser Gln Arg Asp Gly Gly  
 4305 4310 4315 4320  
 Ala Gly Thr Trp Thr Arg His Ala Thr Gly Val Leu Ser Thr Ala Pro  
 4325 4330 4335  
 Ala Gln Glu Pro Glu Phe Asp Phe His Ala Trp Pro Pro Ala Asp Ala  
 4340 4345 4350  
 Glu Arg Ile Asp Val Glu Thr Phe Tyr Thr Asp Leu Ala Glu Arg Gly  
 4355 4360 4365  
 Tyr Gly Tyr Gly Pro Ala Phe Gln Gly Leu Gln Ala Val Trp Arg Arg  
 4370 4375 4380  
 Asp Gly Asp Val Phe Ala Glu Val Ala Leu Pro Glu Asp Leu Arg Lys  
 4385 4390 4395 4400  
 Asp Ala Gly Arg Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala Leu  
 4405 4410 4415  
 Gln Ala Ala Thr Ala Val Gly Gly Asp Glu Pro Gly Gln Pro Val Leu  
 4420 4425 4430  
 Ala Phe Ala Trp Asn Gly Leu Val Leu His Ala Ala Gly Ala Ser Ala  
 4435 4440 4445  
 Leu Arg Val Arg Leu Ala Pro Ser Gly Pro Asp Thr Leu Ser Val Ala  
 4450 4455 4460  
 Ala Ala Asp Glu Thr Gly Gly Leu Val Leu Thr Met Glu Ser Leu Val  
 4465 4470 4475 4480  
 Ser Arg Pro Val Ser Ala Glu Gln Leu Gly Ala Ala Ala Asp Ala Gly  
 4485 4490 4495  
 His Asp Ala Met Phe Arg Val Asp Trp Thr Glu Leu Pro Ala Val Pro  
 4500 4505 4510  
 Arg Ala Glu Leu Pro Pro Trp Val Arg Ile Asp Thr Ala Asp Asp Val  
 4515 4520 4525

Ala Ala Leu Ala Glu Lys Ala Asp Ala Pro Pro Val Val Val Trp Glu  
 4530 4535 4540  
 Ala Ala Gly Gly Asp Pro Ala Leu Ala Val Ser Ser Arg Val Leu Glu  
 4545 4550 4555 4560  
 Ile Met Gln Ala Trp Leu Ala Ala Pro Ala Phe Glu Glu Ala Arg Leu  
 4565 4570 4575  
 Val Val Thr Thr Arg Gly Ala Val Pro Ala Gly Gly Asp His Thr Leu  
 4580 4585 4590  
 Thr Asp Pro Ala Ala Ala Ala Val Trp Gly Leu Val Arg Ser Ala Gln  
 4595 4600 4605  
 Ala Glu His Pro Asp Arg Val Val Leu Leu Asp Thr Asp Gly Glu Val  
 4610 4615 4620  
 Pro Leu Gly Ala Val Leu Ala Ser Gly Glu Pro Gln Leu Ala Val Arg  
 4625 4630 4635 4640  
 Gly Thr Thr Phe Phe Val Pro Arg Leu Ala Arg Ala Thr Arg Leu Ser  
 4645 4650 4655  
 Asp Ala Pro Pro Ala Phe Asp Pro Asp Gly Thr Val Leu Val Ser Gly  
 4660 4665 4670  
 Ala Gly Ser Leu Gly Thr Leu Val Ala Arg His Leu Val Thr Arg His  
 4675 4680 4685  
 Gly Val Arg Arg Val Val Leu Ala Ser Arg Gln Gly Arg Asp Ala Glu  
 4690 4695 4700  
 Gly Ala Gln Asp Leu Ile Thr Glu Leu Thr Gly Glu Gly Ala Asp Val  
 4705 4710 4715 4720  
 Ser Phe Val Ala Cys Asp Val Ser Asp Arg Asp Gln Val Ala Ala Leu  
 4725 4730 4735  
 Leu Ala Gly Leu Pro Asp Leu Thr Gly Val Val His Thr Ala Gly Val  
 4740 4745 4750  
 Phe Glu Asp Gly Val Ile Glu Ala Leu Thr Pro Asp Gln Leu Ala Asn  
 4755 4760 4765  
 Val Tyr Ala Ala Lys Val Thr Ala Ala Met His Leu Asp Glu Leu Thr  
 4770 4775 4780  
 Arg Asp Arg Asp Leu Gly Ala Phe Val Val Phe Ser Ser Val Ala Gly  
 4785 4790 4795 4800  
 Val Met Gly Gly Gly Gly Gln Gly Pro Tyr Ala Ala Ala Asn Ala Phe  
 4805 4810 4815  
 Leu Asp Ala Ala Met Ala Ser Arg Gln Ala Ala Gly Leu Pro Gly Leu  
 4820 4825 4830  
 Ser Leu Ala Trp Gly Leu Trp Glu Arg Ser Ser Gly Met Ala Ala His  
 4835 4840 4845  
 Leu Ser Glu Val Asp His Ala Arg Ala Ser Arg Asn Gly Val Leu Glu

4850	4855	4860
Leu Thr Arg Ala Glu Gly	Leu Ala Leu Phe Asp	Leu Gly Leu Arg Met
4865	4870	4875 4880
Ala Glu Ser Leu Leu Val	Pro Ile Lys Leu Asp	Leu Ala Ala Met Arg
4885	4890	4895
Ala Ser Thr Val Pro Val	Leu Phe Arg Gly Leu Val	Arg Pro Ser Arg
4900	4905	4910
Thr Gln Ala Arg Thr Ala	Ser Thr Val Asp Arg Gly	Leu Ala Gly Arg
4915	4920	4925
Leu Ala Gly Leu Pro Val	Ala Glu Arg Ala Ala Val	Leu Val Asp Leu
4930	4935	4940
Val Arg Gly Gln Val Ala	Val Val Leu Gly Tyr Asp	Gly Pro Glu Ala
4945	4950	4955 4960
Val Arg Pro Asp Thr Ala	Phe Lys Asp Thr Gly Phe	Asp Ser Leu Thr
4965	4970	4975
Ser Val Glu Leu Arg Asn	Arg Leu Arg Glu Ala Thr	Gly Leu Lys Leu
4980	4985	4990
Pro Ala Thr Leu Val Phe	Asp Tyr Pro Asn Pro Leu	Ala Val Ala Arg
4995	5000	5005
Tyr Leu Gly Ala Arg Leu	Val Pro Asp Gly Thr Ala	Asn Gly Asn Gly
5010	5015	5020
Asn Gly Asn Gly His Ser	Glu Asp Asp Arg Leu Arg	His Ala Leu Ala
5025	5030	5035 5040
Ala Ile Ala Ala Glu Asp	Ala Gly Glu Glu Arg Ser	Ile Ala Asp Leu
5045	5050	5055
Gly Val Asp Asp Leu Val	Gln Leu Ala Phe Gly Asp	Glu
5060	5065	

&lt;210&gt; 6

&lt;211&gt; 1721

&lt;212&gt; PRT

&lt;213&gt; Amycolatopsis mediterranei

&lt;400&gt; 6

Met	Ala	Cys	Arg	Leu	Pro	Gly	Gly	Val	Thr	Gly	Pro	Gly	Asp	Leu	Trp
1				5					10					15	

Arg	Leu	Val	Ala	Glu	Gly	Gly	Asp	Ala	Val	Ser	Gly	Phe	Pro	Thr	Asp
		20						25					30		

Arg	Cys	Trp	Asp	Leu	Asp	Thr	Leu	Phe	Asp	Pro	Asp	Pro	Asp	His	Ala
		35					40					45			

Gly	Thr	Ser	Tyr	Thr	Asp	Gln	Gly	Gly	Phe	Leu	His	Asp	Ala	Ala	Leu
	50					55							60		

Phe	Asp	Pro	Gly	Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

65	70	75	80
Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Leu Glu	85	90	95
Gly Val Gly Leu Asp Pro Ala Ser Leu Gln Gly Thr Asp Val Gly Val	100	105	110
Phe Thr Gly Ala Gly Gly Ser Gly Tyr Gly Gly Gly Leu Thr Gly Pro	115	120	125
Glu Met Gln Ser Phe Ala Gly Thr Gly Leu Ala Ser Ser Val Ala Ser	130	135	140
Gly Arg Val Ser Tyr Val Phe Gly Phe Glu Gly Pro Ala Val Thr Ile	145	150	155
Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Met His Leu Ala Ala Gln	165	170	175
Ala Leu Arg Gln Gly Asp Cys Ser Met Ala Leu Ala Gly Gly Ala Met	180	185	190
Val Met Ser Gly Pro Asp Ser Phe Val Val Phe Ser Arg Gln Arg Gly	195	200	205
Leu Ala Thr Asp Gly Arg Cys Lys Ala Phe Ala Ser Gly Ala Asp Gly	210	215	220
Met Val Leu Ala Glu Gly Ile Ser Val Val Val Leu Glu Arg Leu Ser	225	230	235
Val Ala Arg Glu Arg Gly His Arg Val Leu Ala Val Leu Arg Gly Ser	245	250	255
Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly	260	265	270
Pro Ser Gln Gln Arg Val Ile Arg Ala Ala Leu Ala Asn Ala Gly Ile	275	280	285
Gly Pro Ser Asp Val Asp Leu Val Glu Ala His Gly Thr Gly Thr Ser	290	295	300
Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln	305	310	315
Asp Arg Glu Thr Pro Leu Trp Leu Gly Ser Leu Lys Ser Asn Ile Gly	325	330	335
His Thr Gln Ala Ala Ala Gly Val Ala Ser Val Ile Lys Val Val Gln	340	345	350
Ala Leu Arg His Gly Val Met Pro Pro Thr Leu His Val Asp Glu Pro	355	360	365
Ser Ser Gln Val Asp Trp Ser Glu Gly Ala Val Glu Leu Leu Thr Gly	370	375	380
Ser Arg Asp Trp Pro Arg Gly Asp Arg Pro Arg Arg Ala Gly Val Ser	385	390	395
			400

Ser Phe Gly Val Ser Gly Thr Asn Val His Leu Ile Ile Glu Glu Ala  
 405 410 415  
 Pro Glu Glu Pro Ala Ala Ala Val Pro Thr Ser Ala Asp Val Val Pro  
 420 425 430  
 Leu Val Val Ser Ala Arg Ser Thr Gly Ser Leu Ala Gly Gln Ala Asp  
 435 440 445  
 Arg Leu Thr Glu Val Asp Val Pro Leu Gly His Leu Ala Gly Ala Leu  
 450 455 460  
 Val Ala Gly Arg Ala Val Leu Glu Glu Arg Ala Val Val Val Ala Gly  
 465 470 475 480  
 Ser Ala Glu Glu Ala Arg Ala Gly Leu Gly Ala Leu Ala Arg Gly Glu  
 485 490 495  
 Ala Ala Pro Gly Val Val Thr Gly Thr Ala Gly Lys Pro Gly Lys Val  
 500 505 510  
 Val Trp Val Phe Pro Gly Gln Gly Thr Gln Trp Val Gly Met Gly Arg  
 515 520 525  
 Glu Leu Leu Asp Ala Ser Pro Val Phe Ala Glu Arg Ile Lys Glu Cys  
 530 535 540  
 Ala Ala Ala Leu Asp Gln Trp Thr Asp Trp Ser Leu Leu Asp Val Leu  
 545 550 555 560  
 Arg Gly Asp Gly Asp Leu Asp Ser Val Glu Val Leu Gln Pro Ala Cys  
 565 570 575  
 Phe Ala Val Met Val Gly Leu Ala Ala Val Trp Glu Ser Ala Gly Val  
 580 585 590  
 Arg Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala  
 595 600 605  
 Cys Val Ser Gly Ala Leu Thr Leu Asp Asp Ala Ala Lys Val Val Ala  
 610 615 620  
 Leu Arg Ser Gln Ala Ile Ala Ala Arg Leu Ser Gly Arg Gly Gly Met  
 625 630 635 640  
 Ala Ser Val Ala Leu Ser Glu Asp Glu Ala Asn Ala Arg Leu Gly Leu  
 645 650 655  
 Trp Asp Gly Arg Ile Glu Val Ala Ala Val Asn Gly Pro Ala Ser Val  
 660 665 670  
 Val Ile Ala Gly Asp Ala Gln Ala Leu Asp Glu Ala Leu Glu Val Leu  
 675 680 685  
 Ala Gly Asp Gly Val Arg Val Arg Gln Val Ala Val Asp Tyr Ala Ser  
 690 695 700  
 His Thr Arg His Val Glu Asp Ile Arg Asp Thr Leu Ala Glu Thr Leu  
 705 710 715 720

Ala Gly Ile Thr Ala Gln Ala Pro Asp Val Pro Phe Arg Ser Thr Val  
 725 730 735  
 Thr Gly Gly Trp Val Arg Asp Ala Asp Val Leu Asp Gly Gly Tyr Trp  
 740 745 750  
 Tyr Arg Asn Leu Arg Asn Gln Val Arg Phe Gly Pro Ala Val Ala Glu  
 755 760 765  
 Leu Leu Glu Gln Gly His Gly Val Phe Val Glu Val Ser Ala His Pro  
 770 775 780  
 Val Leu Val Gln Pro Ile Ser Glu Leu Thr Asp Ala Val Val Thr Gly  
 785 790 795 800  
 Thr Leu Arg Arg Asp Asp Gly Gly Leu Arg Arg Leu Leu Thr Ser Met  
 805 810 815  
 Ala Glu Leu Phe Val Arg Gly Val Arg Val Asp Trp Ala Thr Leu Val  
 820 825 830  
 Pro Pro Ala Arg Val Asp Leu Pro Thr Tyr Ala Phe Asp His Gln His  
 835 840 845  
 Phe Trp Leu Arg Pro Ala Ala Gln Ala Asp Ala Val Ser Leu Gly Gln  
 850 855 860  
 Ala Ala Ala Glu His Pro Leu Leu Gly Ala Val Val Arg Leu Pro Gln  
 865 870 875 880  
 Ser Asp Gly Leu Val Phe Thr Ser Arg Leu Ser Leu Arg Thr His Pro  
 885 890 895  
 Trp Leu Ala Asp His Thr Ile Gly Gly Val Val Leu Phe Pro Gly Thr  
 900 905 910  
 Gly Leu Val Glu Leu Ala Val Arg Ala Gly Asp Glu Ala Gly Cys Pro  
 915 920 925  
 Val Leu Asp Glu Leu Val Thr Glu Ala Pro Leu Val Val Pro Gly Gln  
 930 935 940  
 Gly Gly Val Asn Val Gln Val Thr Val Ser Gly Pro Asp Gln Asn Gly  
 945 950 955 960  
 Leu Arg Thr Val Asp Ile His Ser Gln Arg Asp Asp Val Trp Thr Arg  
 965 970 975  
 His Ala Thr Gly Thr Val Ser Ala Thr Pro Ala Ser Ser Pro Gly Phe  
 980 985 990  
 Asp Phe Thr Ala Trp Pro Pro Pro Asp Gly Gln Arg Val Glu Ile Gly  
 995 1000 1005  
 Asp Phe Tyr Ala Asp Leu Ala Glu Arg Gly Tyr Ala Tyr Gly Pro Leu  
 1010 1015 1020  
 Phe Gln Gly Val Arg Ala Val Trp Gln Arg Gly Glu Asp Val Phe Ala  
 1025 1030 1035 1040  
 Glu Val Ala Leu Pro Glu Asp Arg Arg Glu Asp Ala Ala Arg Phe Gly



1045	1050	1055
Leu His Pro Ala Leu Leu Asp Ala Ala	Leu Gln Thr Gly Thr Ile Ala	
1060	1065	1070
Ala Ala Ala Ser Gly Gln Pro Gly Lys Ser Val Met Pro Phe Ser Trp		
1075	1080	1085
Asn Arg Leu Ala Leu His Ala Val Gly Ala Ala Gly Leu Arg Val Arg		
1090	1095	1100
Val Ala Pro Gly Gly Pro Asp Ala Leu Thr Val Glu Ala Ala Asp Glu		
1105	1110	1115
Thr Gly Ala Pro Val Leu Thr Met Asp Ser Leu Ile Leu Arg Glu Val		
1125	1130	1135
Ala Leu Asp Gln Leu Asp Thr Ala Arg Ala Gly Ser Leu Tyr Arg Val		
1140	1145	1150
Asp Trp Thr Pro Leu Pro Thr Val Asp Ser Ala Val Pro Ala Gly Arg		
1155	1160	1165
Ala Glu Val Leu Glu Ala Phe Gly Glu Glu Pro Leu Asp Leu Thr Gly		
1170	1175	1180
Arg Val Leu Ala Ala Leu Gln Ala Trp Leu Ser Asp Ala Ala Glu Glu		
1185	1190	1195
Ala Arg Leu Val Val Val Thr Arg Gly Ala Val Pro Ala Gly Asp Gly		
1205	1210	1215
Val Val Ser Asp Pro Ala Gly Ala Ala Val Trp Gly Leu Val Arg Ala		
1220	1225	1230
Ala Gln Ala Glu Asn Pro Asp Arg Phe Val Leu Leu Asp Thr Asp Gly		
1235	1240	1245
Glu Val Pro Leu Glu Ala Val Leu Ala Thr Gly Glu Pro Gln Leu Ala		
1250	1255	1260
Leu Arg Gly Thr Thr Phe Ser Val Pro Arg Leu Ala Arg Val Thr Glu		
1265	1270	1275
Pro Ala Glu Ala Pro Leu Thr Phe Arg Pro Asp Gly Thr Val Leu Val		
1285	1290	1295
Ser Gly Ala Gly Thr Leu Gly Ala Leu Ala Ala Arg Asp Leu Val Thr		
1300	1305	1310
Arg His Gly Val Arg Arg Leu Val Leu Ala Ser Arg Arg Gly Arg Ala		
1315	1320	1325
Ala Glu Gly Ile Asp Asp Leu Val Ala Glu Leu Thr Gly His Gly Ala		
1330	1335	1340
Glu Val Thr Val Ala Ala Cys Asp Val Ser Asp Arg Asp Gln Val Ala		
1345	1350	1355
Ala Leu Leu Lys Glu His Ala Leu Thr Ala Val Val His Thr Ala Gly		
1365	1370	1375

Val Phe Asp Ala Gly Val Thr Gly Ala Leu Thr Arg Glu Arg Leu Ala  
 1380 1385 1390  
 Lys Val Phe Ala Pro Lys Val Asp Ala Ala Asn His Leu Asp Glu Leu  
 1395 1400 1405  
 Thr Arg Asp Leu Asp Leu Asp Ala Phe Ile Val Tyr Ser Ser Ala Ser  
 1410 1415 1420  
 Ser Ile Phe Met Gly Ala Gly Ser Gly Gly Tyr Ala Ala Ala Asn Ala  
 1425 1430 1435 1440  
 Tyr Leu Asp Gly Leu Met Ala Ala Arg Arg Ala Ala Gly Leu Pro Gly  
 1445 1450 1455  
 Leu Ser Leu Ala Trp Gly Pro Trp Glu Gln Leu Thr Gly Met Ala Asp  
 1460 1465 1470  
 Thr Ile Asp Asp Leu Thr Leu Ala Arg Met Ser Arg Arg Glu Gly Arg  
 1475 1480 1485  
 Gly Gly Val Arg Ala Leu Gly Ser Ala Asp Gly Met Glu Leu Phe Asp  
 1490 1495 1500  
 Ala Ala Leu Ala Ala Gly Gln Ala Leu Leu Val Pro Ile Glu Leu Asp  
 1505 1510 1515 1520  
 Leu Arg Glu Val Arg Ala Asp Ala Ala Gly Gly Gly Thr Val Pro His  
 1525 1530 1535  
 Leu Leu Arg Gly Leu Val Arg Ala Gly Arg Gln Ala Ala Arg Thr Ala  
 1540 1545 1550  
 Ala Thr Glu Asp Gly Gly Leu Glu Arg Arg Leu Ala Gly Leu Thr Val  
 1555 1560 1565  
 Ala Glu Gln Glu Ala Leu Leu Leu Asp Leu Val Arg Gly Gln Val Ala  
 1570 1575 1580  
 Val Val Leu Gly His Ala Asp Ser Ser Gly Val Arg Ala Asp Ala Ala  
 1585 1590 1595 1600  
 Phe Lys Asp Ala Gly Phe Asp Ser Leu Thr Ser Val Glu Leu Arg Asn  
 1605 1610 1615  
 Arg Leu Arg Glu Thr Thr Gly Leu Lys Leu Pro Ala Thr Leu Val Phe  
 1620 1625 1630  
 Asp His Pro Asn Pro Leu Ala Leu Ala Arg His Leu Arg Ala Glu Leu  
 1635 1640 1645  
 Ala Val Asp Glu Ala Ser Pro Ala Asp Ala Val Leu Ala Gly Leu Ala  
 1650 1655 1660  
 Gly Leu Glu Ala Ala Ile Ala Ala Ala Gly Ala Pro Asp Gly Asp Arg  
 1665 1670 1675 1680  
 Ile Thr Ala Arg Leu Arg Glu Leu Leu Lys Ala Ala Glu Ala Ala Glu  
 1685 1690 1695

Ala Arg Pro Gly Thr Ser Gly Asp Leu Asp Thr Ala Ser Asp Glu Glu  
 1700 1705 1710

Leu Phe Ala Leu Val Asp Gly Leu Asp  
 1715 1720

<210> 7

<211> 1688

<212> PRT

<213> *Amycolatopsis mediterranei*

<400> 7

Met Ala Cys Arg Tyr Pro Gly Gly Val Ser Ser Pro Glu Asp Leu Trp  
 1 5 10 15

Arg Leu Val Ala Glu Gly Thr Asp Ala Val Ser Ala Phe Pro Gly Asp  
 20 25 30

Arg Gly Trp Asp Val Asp Gly Leu Val Asp Pro Asp Pro Asp Arg Pro  
 35 40 45

Gly Thr Thr Tyr Thr Asp Gln Gly Gly Phe Leu His Glu Ala Gly Leu  
 50 55 60

Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Val Ala Met  
 65 70 75 80

Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Ile Glu  
 85 90 95

Arg Thr Gly Thr Asp Pro Leu Ser Leu Lys Gly Ser Asp Ile Gly Val  
 100 105 110

Phe Thr Gly Val Ala Ser Met Gly Tyr Gly Ala Gly Gly Gly Val Val  
 115 120 125

Ala Pro Glu Leu Glu Gly Phe Val Gly Thr Gly Ala Ala Pro Cys Ile  
 130 135 140

Ala Ser Gly Arg Val Ser Tyr Val Leu Gly Phe Glu Gly Pro Ala Val  
 145 150 155 160

Thr Val Asp Thr Gly Cys Ser Ser Ser Leu Val Ala Met His Leu Ala  
 165 170 175

Ala Gln Ala Leu Arg Arg Gly Glu Cys Ser Met Ala Leu Ala Gly Gly  
 180 185 190

Ala Met Val Met Ala Gln Pro Gly Ser Phe Val Ser Phe Ser Arg Gln  
 195 200 205

Arg Gly Leu Ala Leu Asp Gly Arg Cys Lys Ala Phe Ser Asp Ser Ala  
 210 215 220

Asp Gly Met Gly Leu Ala Glu Gly Val Gly Val Ile Ala Leu Glu Arg  
 225 230 235 240

Leu Ser Val Ala Arg Glu Arg Gly His Arg Val Leu Ala Val Leu Arg  
 245 250 255

Gly Ile Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro  
 260 265 270  
 Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Ala Ala Leu Ala Glu Ala  
 275 280 285  
 Gly Leu Ser Pro Ser Asp Val Asp Ala Val Glu Gly His Gly Thr Gly  
 290 295 300  
 Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr  
 305 310 315 320  
 Gly Lys Gly Arg Asp Pro Glu Lys Pro Leu Trp Leu Gly Ser Val Lys  
 325 330 335  
 Ser Asn Leu Gly His Thr Gln Ala Ala Ala Gly Val Ala Ser Val Ile  
 340 345 350  
 Lys Met Val Gln Ala Leu Arg His Gly Val Leu Pro Pro Thr Leu His  
 355 360 365  
 Val Asp Arg Pro Ser Thr Glu Val Asp Trp Ser Ala Gly Ala Val Ser  
 370 375 380  
 Leu Leu Thr Glu Ala Arg Glu Trp Pro Arg Glu Gly Arg Pro Arg Arg  
 385 390 395 400  
 Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Leu Ile  
 405 410 415  
 Leu Glu Glu Ala Pro Glu Glu Glu Pro Pro Val Ala Glu Ala Pro Ser  
 420 425 430  
 Ala Gly Val Val Pro Val Val Val Ser Ala Arg Gly Ala Leu Ala Gly  
 435 440 445  
 Gln Ala Gly Arg Leu Ala Ala Phe Leu Glu Ala Ser Asp Glu Pro Leu  
 450 455 460  
 Val Thr Val Ala Gly Ala Leu Ile Cys Gly Arg Ser Arg Phe Gly Asp  
 465 470 475 480  
 Arg Ala Val Val Val Ala Gly Thr Arg Ala Glu Ala Thr Ala Gly Leu  
 485 490 495  
 Ala Ala Leu Ala Arg Gly Glu Ser Ala Ala Asp Val Val Thr Gly Thr  
 500 505 510  
 Val Ala Ala Ser Gly Val Pro Gly Lys Leu Val Trp Val Phe Pro Gly  
 515 520 525  
 Gln Gly Ser Gln Trp Val Gly Met Gly Arg Glu Leu Leu Glu Ala Ser  
 530 535 540  
 Pro Val Phe Ala Ala Arg Ile Ala Glu Cys Ala Ala Ala Leu Glu Pro  
 545 550 555 560  
 Trp Ile Asp Trp Ser Leu Leu Asp Val Leu Arg Gly Glu Gly Asp Leu  
 565 570 575  
 Asp Arg Val Asp Val Val Gln Pro Ala Ser Phe Ala Val Met Val Gly

580	585	590
Leu Ala Ala Val Trp Ser Ser Val Gly Val Val Pro Asp Ala Val Leu 595 600 605		
Gly His Ser Gln Gly Glu Ile Ala Ala Ala Cys Val Ser Gly Ala Leu 610 615 620		
Ser Leu Gln Asp Ala Ala Lys Val Val Ala Leu Arg Ser Gln Ala Ile 625 630 635 640		
Ala Ala Lys Leu Ala Gly Arg Gly Gly Met Ala Ser Val Ala Leu Ser 645 650 655		
Glu Glu Asp Ala Val Ala Arg Leu Arg His Trp Ala Asp Arg Val Glu 660 665 670		
Val Ala Ala Val Asn Ser Pro Ser Ser Val Val Ile Ala Gly Asp Ala 675 680 685		
Glu Ala Leu Asp Gln Ala Leu Glu Ala Leu Thr Gly Gln Asp Ile Arg 690 695 700		
Val Arg Arg Val Ala Val Asp Tyr Ala Ser His Thr Arg His Val Glu 705 710 715 720		
Asp Ile Gln Glu Pro Leu Ala Glu Ala Leu Ala Gly Ile Glu Ala His 725 730 735		
Ala Pro Thr Leu Pro Phe Phe Ser Thr Leu Thr Gly Asp Trp Ile Arg 740 745 750		
Glu Ala Gly Val Val Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg Asn 755 760 765		
Gln Val Gly Phe Gly Pro Ala Val Ala Glu Leu Leu Gly Leu Gly His 770 775 780		
Arg Val Phe Val Glu Val Ser Ala His Pro Val Leu Val Gln Ala Ile 785 790 795 800		
Ser Ala Ile Ala Asp Asp Thr Asp Ala Val Val Thr Gly Ser Leu Arg 805 810 815		
Arg Glu Glu Gly Gly Leu Arg Arg Leu Leu Thr Ser Met Ala Glu Leu 820 825 830		
Phe Val Arg Gly Val Asp Val Asp Trp Ala Thr Met Val Pro Pro Ala 835 840 845		
Arg Val Asp Leu Pro Thr Tyr Ala Phe Asp His Gln His Tyr Trp Leu 850 855 860		
Arg Tyr Val Glu Thr Ala Thr Asp Ala Ala Gly Pro Val Val Arg Leu 865 870 875 880		
Pro Gln Thr Gly Gly Leu Val Phe Thr Thr Glu Trp Ser Leu Lys Ser 885 890 895		
Gln Pro Trp Leu Ala Glu His Thr Leu Glu Asp Leu Val Val Val Pro 900 905 910		

Gly Ala Ala Leu Val Glu Leu Ala Val Arg Ala Gly Asp Glu Ala Gly  
 915 920 925  
 Thr Pro Val Leu Asp Glu Leu Val Ile Glu Thr Pro Leu Val Val Pro  
 930 935 940  
 Glu Arg Gly Ala Ile Arg Val Gln Val Thr Val Ser Gly Pro Asp Asp  
 945 950 955 960  
 Gly Thr Arg Thr Leu Glu Val His Ser Gln Pro Glu Asp Ala Thr Asp  
 965 970 975  
 Glu Trp Thr Arg His Ala Thr Gly Thr Leu Ser Ala Thr Pro Asp Glu  
 980 985 990  
 Ser Ser Gly Phe Asp Phe Thr Ala Trp Pro Pro Pro Gly Ala Arg Gln  
 995 1000 1005  
 Leu Asp Gly Val Pro Ala Ile Trp Arg Ala Gly Asp Glu Ile Phe Ala  
 1010 1015 1020  
 Glu Val Ser Leu Pro Asp Asp Ala Asp Ala Glu Ala Phe Gly Ile His  
 1025 1030 1035 1040  
 Pro Ala Leu Leu Asp Ala Ala Leu His Pro Ala Leu Pro Gly Asp Asp  
 1045 1050 1055  
 Gly Leu Thr Gln Pro Met Glu Trp Arg Gly Leu Thr Leu His Ala Ala  
 1060 1065 1070  
 Gly Ala Ser Thr Leu Arg Val Arg Leu Val Pro Gly Gly Phe Leu Glu  
 1075 1080 1085  
 Ala Ala Asp Gly Ala Gly Ser Leu Val Val Thr Ala Lys Glu Val Ala  
 1090 1095 1100  
 Leu Arg Pro Val Thr Ile Ala Arg Ser Arg Thr Thr Thr Arg Asp Ser  
 1105 1110 1115 1120  
 Leu Phe Gln Leu Asn Trp Ile Glu Leu Pro Glu Ser Gly Val Val Ala  
 1125 1130 1135  
 Ala Ala Asp Asp Thr Glu Val Leu Glu Val Pro Ala Gly Asp Ser Pro  
 1140 1145 1150  
 Leu Ala Ala Thr Ser Arg Val Leu Glu Arg Leu Gln Thr Trp Leu Thr  
 1155 1160 1165  
 Glu Pro Glu Ala Glu Gln Leu Val Val Val Thr Arg Gly Ala Val Pro  
 1170 1175 1180  
 Ala Gly Asp Thr Pro Val Thr Asp Pro Ala Ala Ala Val Trp Gly  
 1185 1190 1195 1200  
 Leu Val Arg Ser Ala Gln Ala Glu Asn Pro Asp Arg Ile Val Leu Leu  
 1205 1210 1215  
 Asp Thr Asp Gly Glu Val Pro Leu Gly Ala Val Leu Ala Gly Gly Glu  
 1220 1225 1230

Pro Gln Val Ala Val Arg Gly Thr Ala Leu Tyr Val Pro Arg Leu Ala  
 1235 1240 1245  
 Arg Ala Asp Ala Ala Pro Val Ser Gly Leu His Gly Thr Val Leu Val  
 1250 1255 1260  
 Ser Gly Ala Gly Val Leu Gly Glu Ile Val Ala Arg His Leu Val Thr  
 1265 1270 1275 1280  
 Arg His Gly Val Arg Lys Leu Val Leu Ala Ser Arg Arg Gly Leu Asp  
 1285 1290 1295  
 Ala Asp Gly Ala Lys Asp Leu Val Thr Asp Leu Thr Gly Glu Gly Ala  
 1300 1305 1310  
 Asp Val Ser Val Val Ala Cys Asp Leu Ala Asp Arg Asn Gln Val Ala  
 1315 1320 1325  
 Ala Leu Leu Ala Asp His Arg Pro Ala Ser Val Ile His Thr Ala Gly  
 1330 1335 1340  
 Val Leu Asp Asp Gly Val Ile Gly Thr Leu Thr Pro Glu Arg Leu Ala  
 1345 1350 1355 1360  
 Lys Val Phe Ala Pro Lys Val Asp Ala Val Arg His Leu Asp Glu Leu  
 1365 1370 1375  
 Thr Arg Asp Leu Asp Leu Asp Ala Phe Val Val Phe Ser Ser Gly Ser  
 1380 1385 1390  
 Gly Val Phe Gly Ser Pro Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala  
 1395 1400 1405  
 Phe Leu Asp Ala Ala Met Ala Ser Arg Arg Ala Ala Gly Leu Pro Gly  
 1410 1415 1420  
 Leu Ser Leu Ala Trp Gly Leu Trp Glu Gln Ala Thr Gly Met Thr Ala  
 1425 1430 1435 1440  
 His Leu Gly Gly Thr Asp Gln Ala Arg Met Ser Arg Gly Gly Val Arg  
 1445 1450 1455  
 Pro Ile Thr Ala Glu Glu Gly Met Ala Leu Phe Asp Thr Ala Leu Gly  
 1460 1465 1470  
 Ala Gln Pro Ala Leu Leu Val Pro Val Lys Leu Asp Leu Arg Glu Val  
 1475 1480 1485  
 Arg Ala Gly Gly Ala Val Pro His Leu Leu Arg Gly Leu Val Arg Ala  
 1490 1495 1500  
 Gly Arg Arg Gln Ala Gln Ala Ala Ser Thr Val Asp Asn Gln Leu Leu  
 1505 1510 1515 1520  
 Gly Arg Leu Ala Gly Leu Gly Ala Pro Glu Gln Glu Ala Leu Leu Val  
 1525 1530 1535  
 Asp Leu Val Arg Gly Gln Val Ala Ala Val Leu Gly His Ala Gly Pro  
 1540 1545 1550  
 Asp Ala Val Arg Ala Asp Thr Ala Phe Lys Asp Ala Gly Phe Asp Ser

1555	1560	1565
Leu Thr Ser Val Asp Leu Arg Asn Arg Leu Arg Glu Ser Thr Gly Leu 1570	1575	1580
Lys Leu Pro Ala Thr Leu Ala Phe Asp Tyr Pro Thr Pro Leu Val Leu 1585	1590	1595 1600
Ala Arg His Leu Arg Asp Glu Leu Gly Ala Gly Asp Asp Ala Leu Ser 1605	1610	1615
Val Val His Ala Arg Leu Glu Asp Val Glu Ala Leu Leu Gly Gly Leu 1620	1625	1630
Arg Leu Asp Glu Ser Thr Lys Thr Gly Leu Thr Leu Arg Leu Gln Gly 1635	1640	1645
Leu Val Ala Arg Cys Asn Gly Val Asn Asp Gln Thr Gly Gly Glu Thr 1650	1655	1660
Leu Ala Asp Arg Leu Glu Ala Ala Ser Ala Asp Glu Val Leu Asp Phe 1665	1670	1675 1680
Ile Asp Glu Glu Leu Gly Leu Thr 1685		

<210> 8  
 <211> 3413  
 <212> PRT  
 <213> Amycolatopsis mediterranei

<400> 8 Met Ala Thr Asp Glu Lys Leu Leu Lys Tyr Leu Lys Arg Val Thr Ala 1 5 10 15
Glu Leu His Ser Leu Arg Lys Gln Gly Ala Arg His Ala Asp Glu Pro 20 25 30
Leu Ala Val Val Gly Met Ala Cys Arg Phe Pro Gly Gly Val Ser Ser 35 40 45
Pro Glu Asp Leu Trp Gln Leu Val Ala Gly Gly Val Asp Ala Leu Ser 50 55 60
Asp Phe Pro Asp Asp Arg Gly Trp Glu Leu Asp Gly Leu Phe Asp Pro 65 70 75 80
Asp Pro Asp His Pro Gly Thr Ser Tyr Thr Ser Gln Gly Gly Phe Leu 85 90 95
Arg Gly Ala Gly Leu Phe Asp Ala Gly Leu Phe Gly Ile Ser Pro Arg 100 105 110
Glu Ala Leu Val Met Asp Pro Gln Gln Arg Val Leu Leu Glu Thr Ser 115 120 125
Trp Glu Ala Leu Glu Asp Ala Gly Val Asp Pro Leu Ser Leu Lys Gly 130 135 140
Ser Asp Val Gly Val Phe Ser Gly Val Phe Thr Gln Gly Tyr Gly Ala



145	150	155	160
Gly Ala Ile Thr Pro Asp Leu Glu Ala Phe Ala Gly Ile Gly Ala Ala	165	170	175
Ser Ser Val Ala Ser Gly Arg Val Ser Tyr Val Phe Gly Leu Glu Gly	180	185	190
Pro Ala Val Thr Ile Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Ile	195	200	205
His Leu Ala Ala Gln Ala Leu Arg Ala Gly Glu Cys Ser Met Ala Leu	210	215	220
Ala Gly Gly Ala Thr Val Met Pro Thr Pro Gly Thr Phe Val Ala Phe	225	230	235
Ser Arg Gln Arg Val Leu Ala Ala Asp Gly Arg Ser Lys Ala Phe Ser	245	250	255
Ser Thr Ala Asp Gly Thr Gly Trp Ala Glu Gly Ala Gly Val Leu Val	260	265	270
Leu Glu Arg Leu Ser Val Ala Gln Glu Arg Gly His Arg Ile Leu Ala	275	280	285
Val Leu Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu	290	295	300
Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Lys Ala Leu	305	310	315
Ala Gly Ala Gly Leu Val Ala Ser Asp Val Asp Val Val Glu Ala His	325	330	335
Gly Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu	340	345	350
Ala Thr Tyr Gly Gln Gly Arg Glu Arg Pro Leu Trp Leu Gly Ser Val	355	360	365
Lys Ser Asn Phe Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val	370	375	380
Ile Lys Met Val Gln Ala Leu Arg His Gly Ala Met Pro Pro Thr Leu	385	390	395
His Val Ala Glu Pro Thr Pro Glu Val Asp Trp Ser Ala Gly Ala Val	405	410	415
Glu Leu Leu Thr Glu Pro Arg Glu Trp Pro Ala Gly Asp Arg Pro Arg	420	425	430
Arg Ala Gly Val Ser Ala Phe Gly Ile Ser Gly Thr Asn Ala His Leu	435	440	445
Ile Leu Glu Glu Ala Pro Pro Ala Asp Ala Val Ala Glu Glu Pro Glu	450	455	460
Phe Lys Gly Pro Val Pro Leu Val Val Ser Ala Gly Ser Pro Thr Ser	465	470	475
			480

Leu Ala Ala Gln Ala Gly Arg Leu Ala Glu Val Leu Ala Ser Gly Gly  
 485 490 495  
 Val Ser Arg Ala Arg Leu Ala Ser Gly Leu Leu Ser Gly Arg Ala Leu  
 500 505 510  
 Leu Gly Asp Arg Ala Val Val Val Ala Gly Thr Asp Glu Asp Ala Val  
 515 520 525  
 Ala Gly Leu Arg Ala Leu Ala Arg Gly Asp Arg Ala Pro Gly Val Leu  
 530 535 540  
 Thr Gly Ser Ala Lys His Gly Lys Val Val Tyr Val Phe Pro Gly Gln  
 545 550 555 560  
 Gly Ser Gln Arg Leu Gly Met Gly Arg Glu Leu Tyr Asp Arg Tyr Pro  
 565 570 575  
 Val Phe Ala Thr Ala Phe Asp Glu Ala Cys Glu Gln Leu Asp Val Cys  
 580 585 590  
 Leu Ala Gly Arg Ala Gly His Arg Val Arg Asp Val Val Leu Gly Glu  
 595 600 605  
 Val Pro Ala Glu Thr Gly Leu Leu Asn Gln Thr Val Phe Thr Gln Ala  
 610 615 620  
 Gly Leu Phe Ala Val Glu Ser Ala Leu Phe Arg Leu Ala Glu Ser Trp  
 625 630 635 640  
 Gly Val Arg Pro Asp Val Val Leu Gly His Ser Ile Gly Glu Ile Thr  
 645 650 655  
 Ala Ala Tyr Ala Ala Gly Val Phe Ser Leu Pro Asp Ala Ala Arg Ile  
 660 665 670  
 Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu Ala Pro Gly Gly Ala  
 675 680 685  
 Met Val Ala Val Ala Ala Ser Glu Ala Glu Val Ala Glu Leu Leu Gly  
 690 695 700  
 Asp Gly Val Glu Leu Ala Ala Val Asn Gly Pro Ser Ala Val Val Leu  
 705 710 715 720  
 Ser Gly Asp Ala Asp Ala Val Val Ala Ala Ala Arg Met Arg Glu  
 725 730 735  
 Arg Gly His Lys Thr Lys Gln Leu Lys Val Ser His Ala Phe His Ser  
 740 745 750  
 Ala Arg Met Ala Pro Met Leu Ala Glu Phe Ala Ala Glu Leu Ala Gly  
 755 760 765  
 Val Thr Trp Arg Glu Pro Glu Ile Pro Val Val Ser Asn Val Thr Gly  
 770 775 780  
 Arg Phe Ala Glu Pro Gly Glu Leu Thr Glu Pro Gly Tyr Trp Ala Glu  
 785 790 795 800

His Val Arg Arg Pro Val Arg Phe Ala Glu Gly Val Ala Ala Ala Thr  
 805 810 815  
 Glu Ser Gly Gly Ser Leu Phe Val Glu Leu Gly Pro Gly Ala Ala Leu  
 820 825 830  
 Thr Ala Leu Val Glu Glu Thr Ala Glu Val Thr Cys Val Ala Ala Leu  
 835 840 845  
 Arg Asp Asp Arg Pro Glu Val Thr Ala Leu Ile Thr Ala Val Ala Glu  
 850 855 860  
 Leu Phe Val Arg Gly Val Ala Val Asp Trp Pro Ala Leu Leu Pro Pro  
 865 870 875 880  
 Val Thr Gly Phe Val Asp Leu Pro Lys Tyr Ala Phe Asp Gln Gln His  
 885 890 895  
 Tyr Trp Leu Gln Pro Ala Ala Gln Ala Thr Asp Ala Ala Ser Leu Gly  
 900 905 910  
 Gln Val Ala Ala Asp His Pro Leu Leu Gly Ala Val Val Arg Leu Pro  
 915 920 925  
 Gln Ser Asp Gly Leu Val Phe Thr Ser Arg Leu Ser Leu Lys Ser His  
 930 935 940  
 Pro Trp Leu Ala Asp His Val Ile Gly Gly Val Val Leu Val Ala Gly  
 945 950 955 960  
 Thr Gly Leu Val Glu Leu Ala Val Arg Ala Gly Asp Glu Ala Gly Cys  
 965 970 975  
 Pro Val Leu Glu Glu Leu Val Ile Glu Ala Pro Leu Val Val Pro Asp  
 980 985 990  
 His Gly Gly Val Arg Ile Gln Val Val Val Gly Ala Pro Gly Glu Thr  
 995 1000 1005  
 Gly Ser Arg Ala Val Glu Val Tyr Ser Leu Arg Glu Asp Ala Gly Ala  
 1010 1015 1020  
 Glu Val Trp Ala Arg His Ala Thr Gly Phe Leu Ala Ala Thr Pro Ser  
 1025 1030 1035 1040  
 Gln His Lys Pro Phe Asp Phe Thr Ala Trp Pro Pro Pro Gly Val Glu  
 1045 1050 1055  
 Arg Val Asp Val Glu Asp Phe Tyr Asp Gly Leu Val Asp Arg Gly Tyr  
 1060 1065 1070  
 Ala Tyr Gly Pro Ser Phe Arg Gly Leu Arg Ala Val Trp Arg Arg Gly  
 1075 1080 1085  
 Asp Glu Val Phe Ala Glu Val Ala Leu Ala Glu Asp Asp Arg Ala Asp  
 1090 1095 1100  
 Ala Ala Arg Phe Gly Ile His Pro Gly Leu Leu Asp Ala Ala Leu His  
 1105 1110 1115 1120  
 Ala Gly Met Ala Gly Ala Thr Thr Thr Glu Glu Pro Gly Arg Pro Val

1125	1130	1135
Leu Pro Phe Ala Trp Asn Gly Leu Val	Leu His Ala Ala Gly Ala Ser	
1140	1145	1150
Ala Leu Arg Val Arg Leu Ala Pro Ser Gly Pro Asp Ala Leu Ser Val		
1155	1160	1165
Glu Ala Ala Asp Glu Ala Gly Gly Leu Val Val Thr Ala Asp Ser Leu		
1170	1175	1180
Val Ser Arg Pro Val Ser Ala Glu Gln Leu Gly Ala Ala Ala Asn His		
1185	1190	1195 1200
Asp Ala Leu Phe Arg Val Glu Trp Thr Glu Ile Ser Ser Ala Gly Asp		
1205	1210	1215
Val Pro Ala Asp His Val Glu Val Leu Glu Ala Val Gly Glu Asp Pro		
1220	1225	1230
Leu Glu Leu Thr Gly Arg Val Leu Glu Ala Val Gln Thr Trp Leu Ala		
1235	1240	1245
Asp Ala Ala Asp Asp Ala Arg Leu Val Val Val Thr Arg Gly Ala Val		
1250	1255	1260
His Glu Val Thr Asp Pro Ala Gly Ala Ala Val Trp Gly Leu Ile Arg		
1265	1270	1275 1280
Ala Ala Gln Ala Glu Asn Pro Asp Arg Ile Val Leu Leu Asp Thr Asp		
1285	1290	1295
Gly Glu Val Pro Leu Gly Arg Val Leu Ala Thr Gly Glu Pro Gln Thr		
1300	1305	1310
Ala Val Arg Gly Ala Thr Leu Phe Ala Pro Arg Leu Ala Arg Ala Glu		
1315	1320	1325
Ala Ala Glu Ala Pro Ala Val Thr Gly Gly Thr Val Leu Ile Ser Gly		
1330	1335	1340
Ala Gly Ser Leu Gly Ala Leu Thr Ala Arg His Leu Val Ala Arg His		
1345	1350	1355 1360
Gly Val Arg Arg Leu Val Leu Val Ser Arg Arg Gly Pro Asp Ala Asp		
1365	1370	1375
Gly Met Ala Glu Leu Thr Ala Glu Leu Ile Ala Gln Gly Ala Glu Val		
1380	1385	1390
Ala Val Val Ala Cys Asp Leu Ala Asp Arg Asp Gln Val Arg Val Leu		
1395	1400	1405
Leu Ala Glu His Arg Pro Asn Ala Val Val His Thr Ala Gly Val Leu		
1410	1415	1420
Asp Asp Gly Val Phe Glu Ser Leu Thr Arg Glu Arg Leu Ala Lys Val		
1425	1430	1435 1440
Phe Ala Pro Lys Val Thr Ala Ala Asn His Leu Asp Glu Leu Thr Arg		
1445	1450	1455

Glu Leu Asp Leu Arg Ala Phe Val Val Phe Ser Ser Ala Ser Gly Val  
 1460 1465 1470  
 Phe Gly Ser Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Tyr Leu  
 1475 1480 1485  
 Asp Ala Val Val Ala Asn Arg Arg Ala Ala Gly Leu Pro Gly Thr Ser  
 1490 1495 1500  
 Leu Ala Trp Gly Leu Trp Glu Gln Thr Asp Gly Met Thr Ala His Leu  
 1505 1510 1515 1520  
 Gly Asp Ala Asp Gln Ala Arg Ala Ser Arg Gly Gly Val Leu Ala Ile  
 1525 1530 1535  
 Ser Pro Ala Glu Gly Met Glu Leu Phe Asp Ala Ala Pro Asp Gly Leu  
 1540 1545 1550  
 Val Val Pro Val Lys Leu Asp Leu Arg Lys Thr Arg Ala Gly Gly Thr  
 1555 1560 1565  
 Val Pro His Leu Leu Arg Gly Leu Val Arg Pro Gly Arg Gln Gln Ala  
 1570 1575 1580  
 Arg Pro Ala Ser Thr Val Asp Asn Gly Leu Ala Gly Arg Leu Ala Gly  
 1585 1590 1595 1600  
 Leu Ala Pro Ala Glu Gln Glu Ala Leu Leu Leu Asp Val Val Arg Thr  
 1605 1610 1615  
 Gln Val Ala Leu Val Leu Gly His Ala Gly Pro Glu Ala Val Arg Ala  
 1620 1625 1630  
 Asp Thr Ala Phe Lys Asp Thr Gly Phe Asp Ser Leu Thr Ser Val Glu  
 1635 1640 1645  
 Leu Arg Asn Arg Leu Arg Glu Ala Ser Gly Leu Lys Leu Pro Ala Thr  
 1650 1655 1660  
 Leu Val Phe Asp Tyr Pro Thr Pro Val Ala Leu Ala Arg Tyr Leu Arg  
 1665 1670 1675 1680  
 Asp Glu Leu Gly Asp Thr Val Ala Thr Thr Pro Val Ala Thr Ala Ala  
 1685 1690 1695  
 Ala Ala Asp Ala Gly Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg  
 1700 1705 1710  
 Leu Pro Gly Gly Val Thr Asp Pro Glu Gly Leu Trp Arg Leu Val Arg  
 1715 1720 1725  
 Asp Gly Leu Glu Gly Leu Ser Pro Phe Pro Glu Asp Arg Gly Trp Asp  
 1730 1735 1740  
 Leu Glu Asn Leu Phe Asp Asp Asp Pro Asp Arg Ser Gly Thr Thr Tyr  
 1745 1750 1755 1760  
 Thr Ser Arg Gly Gly Phe Leu Asp Gly Ala Gly Leu Phe Asp Ala Gly  
 1765 1770 1775

Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln  
 1780 1785 1790  
 Arg Leu Leu Leu Glu Ala Ala Trp Glu Ala Leu Glu Gly Thr Gly Val  
 1795 1800 1805  
 Asp Pro Gly Ser Leu Lys Gly Ala Asp Val Gly Val Phe Ala Gly Val  
 1810 1815 1820  
 Ser Asn Gln Gly Tyr Gly Met Gly Ala Asp Pro Ala Glu Leu Ala Gly  
 1825 1830 1835 1840  
 Tyr Ala Ser Thr Ala Gly Ala Ser Ser Val Val Ser Gly Arg Val Ser  
 1845 1850 1855  
 Tyr Val Phe Gly Phe Glu Gly Pro Ala Val Thr Ile Asp Thr Ala Cys  
 1860 1865 1870  
 Ser Ser Ser Leu Val Ala Met His Leu Ala Gly Gln Ala Leu Arg Gln  
 1875 1880 1885  
 Gly Glu Cys Ser Met Ala Leu Ala Gly Gly Val Thr Val Met Gly Thr  
 1890 1895 1900  
 Pro Gly Thr Phe Val Glu Phe Ala Lys Gln Arg Gly Leu Ala Gly Asp  
 1905 1910 1915 1920  
 Gly Arg Cys Lys Ala Tyr Ala Glu Gly Ala Asp Gly Thr Gly Trp Ala  
 1925 1930 1935  
 Glu Gly Val Gly Val Val Val Leu Glu Arg Leu Ser Val Ala Arg Glu  
 1940 1945 1950  
 Arg Gly His Arg Val Leu Ala Val Leu Arg Gly Ser Ala Val Asn Ser  
 1955 1960 1965  
 Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln  
 1970 1975 1980  
 Arg Val Ile Arg Arg Ala Leu Ala Gly Ala Gly Leu Glu Pro Ser Asp  
 1985 1990 1995 2000  
 Val Asp Ile Val Glu Gly His Gly Thr Gly Thr Ala Leu Gly Asp Pro  
 2005 2010 2015  
 Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Lys Asp Arg Asp Pro  
 2020 2025 2030  
 Glu Thr Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Phe Gly His Thr  
 2035 2040 2045  
 Gln Ser Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Gln Ala Leu  
 2050 2055 2060  
 Arg His Gly Val Met Pro Pro Thr Leu His Val Asp Arg Pro Thr Ser  
 2065 2070 2075 2080  
 Gln Val Asp Trp Ser Ala Gly Ala Val Glu Val Leu Thr Glu Ala Arg  
 2085 2090 2095  
 Glu Trp Pro Arg Asn Gly Arg Pro Arg Arg Ala Gly Val Ser Ser Phe

2100	2105	2110
Gly Ile Ser Gly Thr Asn Ala His Leu Ile Ile Glu Glu Ala Pro Ala 2115 2120 2125		
Glu Pro Gln Leu Ala Gly Pro Pro Pro Asp Gly Gly Val Val Pro Leu 2130 2135 2140		
Val Val Ser Ala Arg Ser Pro Gly Ala Leu Ala Gly Gln Ala Arg Arg 2145 2150 2155 2160		
Leu Ala Thr Phe Leu Gly Asp Gly Pro Leu Ser Asp Val Ala Gly Ala 2165 2170 2175		
Leu Thr Ser Arg Ala Leu Phe Gly Glu Arg Ala Val Val Val Ala Asp 2180 2185 2190		
Ser Ala Glu Glu Ala Arg Ala Gly Leu Gly Ala Leu Ala Arg Gly Glu 2195 2200 2205		
Asp Ala Pro Gly Leu Val Arg Gly Arg Val Pro Ala Ser Gly Leu Pro 2210 2215 2220		
Gly Lys Leu Val Trp Val Phe Pro Gly Gln Gly Thr Gln Trp Val Gly 2225 2230 2235 2240		
Met Gly Arg Glu Leu Leu Glu Glu Ser Pro Val Phe Ala Glu Arg Ile 2245 2250 2255		
Ala Glu Cys Ala Ala Ala Leu Glu Pro Trp Ile Gly Trp Ser Leu Phe 2260 2265 2270		
Asp Val Leu Arg Gly Asp Gly Asp Leu Asp Arg Val Asp Val Leu Gln 2275 2280 2285		
Pro Ala Cys Phe Ala Val Met Val Gly Leu Ala Ala Val Trp Ser Ser 2290 2295 2300		
Ala Gly Val Val Pro Asp Ala Val Leu Gly His Ser Gln Gly Glu Ile 2305 2310 2315 2320		
Ala Ala Ala Cys Val Ser Gly Ala Leu Ser Leu Glu Asp Ala Ala Lys 2325 2330 2335		
Val Val Ala Leu Arg Ser Gln Ala Ile Ala Ala Lys Leu Ser Gly Arg 2340 2345 2350		
Gly Gly Met Ala Ser Val Ala Leu Gly Glu Ala Asp Val Val Ser Arg 2355 2360 2365		
Leu Ala Asp Gly Val Glu Val Ala Ala Val Asn Gly Pro Ala Ser Val 2370 2375 2380		
Val Ile Ala Gly Asp Ala Gln Ala Leu Asp Glu Thr Leu Glu Ala Leu 2385 2390 2395 2400		
Ser Gly Ala Gly Ile Arg Ala Arg Arg Val Ala Val Asp Tyr Ala Ser 2405 2410 2415		
His Thr Arg His Val Glu Asp Ile Glu Asp Thr Leu Ala Glu Ala Leu 2420 2425 2430		

Ala Gly Ile Asp Ala Arg Ala Pro Leu Val Pro Phe Leu Ser Thr Leu  
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 Thr Gly Glu Trp Ile Arg Asp Glu Gly Val Val Asp Gly Gly Tyr Trp  
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 Tyr Arg Asn Leu Arg Gly Arg Val Arg Phe Gly Pro Ala Val Glu Ala  
 2465 2470 2475 2480  
 Leu Leu Ala Gln Gly His Gly Val Phe Val Glu Leu Ser Ala His Pro  
 2485 2490 2495  
 Val Leu Val Gln Pro Ile Thr Glu Leu Thr Asp Glu Thr Ala Ala Val  
 2500 2505 2510  
 Val Thr Gly Ser Leu Arg Arg Asp Asp Gly Gly Leu Arg Arg Leu Leu  
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 Thr Ser Met Ala Glu Leu Phe Val Arg Gly Val Glu Val Asp Trp Thr  
 2530 2535 2540  
 Ser Leu Val Pro Pro Ala Arg Ala Asp Leu Pro Thr Tyr Ala Phe Asp  
 2545 2550 2555 2560  
 His Glu His Tyr Trp Leu Arg Ala Ala Asp Thr Ala Ser Asp Ala Val  
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 Ser Leu Gly Leu Ala Gly Ala Asp His Pro Leu Leu Gly Ala Val Val  
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 Gln Leu Pro Gln Ser Asp Gly Leu Val Phe Thr Ser Arg Leu Ser Leu  
 2595 2600 2605  
 Arg Ser His Pro Trp Leu Ala Asp His Ala Val Arg Asp Val Val Ile  
 2610 2615 2620  
 Val Pro Gly Thr Gly Leu Val Glu Leu Ala Val Arg Ala Gly Asp Glu  
 2625 2630 2635 2640  
 Ala Gly Cys Pro Val Leu Asp Glu Leu Val Ile Glu Ala Pro Leu Val  
 2645 2650 2655  
 Val Pro Arg Arg Gly Gly Val Arg Val Gln Val Ala Leu Gly Gly Pro  
 2660 2665 2670  
 Ala Asp Asp Gly Ser Arg Thr Val Asp Val Phe Ser Leu Arg Glu Asp  
 2675 2680 2685  
 Ala Asp Ser Trp Leu Arg His Ala Thr Gly Val Leu Val Pro Glu Asn  
 2690 2695 2700  
 Arg Pro Arg Gly Thr Ala Ala Phe Asp Phe Ala Ala Trp Pro Pro Pro  
 2705 2710 2715 2720  
 Glu Ala Lys Pro Val Asp Leu Thr Gly Ala Tyr Asp Val Leu Ala Asp  
 2725 2730 2735  
 Val Gly Tyr Gly Tyr Gly Pro Thr Phe Arg Ala Val Arg Ala Val Trp  
 2740 2745 2750



Arg Arg Gly Ser Gly Asn Thr Thr Glu Thr Phe Ala Glu Ile Ala Leu  
 2755 2760 2765  
 Pro Glu Asp Ala Arg Ala Glu Ala Gly Arg Phe Gly Ile His Pro Ala  
 2770 2775 2780  
 Leu Leu Asp Ala Ala Leu His Ser Thr Met Val Ser Ala Ala Ala Asp  
 2785 2790 2795 2800  
 Thr Glu Ser Tyr Gly Asp Glu Val Arg Leu Pro Phe Ala Trp Asn Gly  
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 Lys Pro Glu Arg Asp Ser Leu Ser Leu Glu Ala Val Asp Glu Ser Gly  
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 Gly Leu Val Val Thr Leu Asp Ser Leu Val Gly Arg Pro Val Ser Asn  
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 Asp Gln Leu Thr Thr Ala Ala Gly Pro Ala Gly Ala Gly Ser Leu Tyr  
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 Arg Val Asp Trp Thr Pro Leu Ser Ser Val Asp Thr Ser Gly Arg Val  
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 Leu Asp Val Val Gln Cys Trp Leu Ala Gly Gly Gly Leu Glu Gly Thr  
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 Lys Leu Ala Ile Val Thr Arg Gly Ala Val Pro Ala Gly Asp Gly Val  
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 Val His Asp Pro Ala Ala Ala Ala Val Trp Gly Leu Val Arg Ala Ala  
 2980 2985 2990  
 Gln Ala Glu Asn Pro Asp Arg Ile Val Leu Leu Asp Val Glu Pro Glu  
 2995 3000 3005  
 Ala Asp Val Pro Pro Leu Leu Gly Ser Val Leu Ala Asp Gly Glu Pro  
 3010 3015 3020  
 Gln Val Ala Val Arg Gly Thr Thr Leu Ser Ile Pro Arg Leu Ala Arg  
 3025 3030 3035 3040  
 Ala Ala Arg Pro Asp Pro Ala Ala Gly Phe Lys Thr Arg Gly Pro Val  
 3045 3050 3055  
 Leu Val Thr Gly Gly Thr Gly Ser Leu Gly Gly Leu Val Ala Arg His  
 3060 3065 3070  
 Leu Val Glu Arg His Gly Val Arg Gln Leu Val Leu Ala Ser Arg Arg

3075	3080	3085
Gly Leu Asp Ala Glu Gly Ala Lys Asp Leu Val Thr Asp Leu Thr Ala 3090	3095	3100
Leu Gly Ala Asp Val Ala Val Ala Ala Cys Asp Val Ala Asp Arg Asp 3105	3110	3115 3120
Gln Val Ala Ala Leu Leu Thr Glu His Arg Pro Ser Ala Val Val His 3125	3130	3135
Thr Ala Gly Val Pro Asp Ala Gly Val Ile Gly Thr Val Thr Pro Asp 3140	3145	3150
Arg Leu Ala Glu Val Phe Ala Pro Lys Val Thr Ala Ala Arg His Leu 3155	3160	3165
Asp Glu Leu Thr Arg Asp Leu Asp Leu Asp Ser Phe Val Val Tyr Ser 3170	3175	3180
Ser Val Ser Ala Val Phe Met Gly Ala Gly Ser Gly Ser Tyr Ala Ala 3185	3190	3195 3200
Ala Asn Ala Tyr Leu Asp Gly Leu Met Ala His Arg Arg Ala Ala Gly 3205	3210	3215
Leu Pro Gly Gln Ser Leu Ala Trp Gly Leu Trp Asp Gln Thr Thr Gly 3220	3225	3230
Gly Met Ala Ala Gly Thr Asp Glu Ala Gly Arg Ala Arg Met Thr Arg 3235	3240	3245
Arg Gly Gly Leu Val Ala Met Lys Pro Ala Ala Gly Leu Asp Leu Phe 3250	3255	3260
Asp Ala Ala Ile Gly Ser Gly Glu Pro Leu Leu Val Pro Ala Gln Leu 3265	3270	3275 3280
Asp Leu Arg Gly Leu Arg Ala Glu Ala Ala Gly Gly Thr Glu Val Pro 3285	3290	3295
His Leu Leu Arg Gly Leu Val Arg Ala Gly Arg Gln Gln Ala Arg Ala 3300	3305	3310
Ala Ser Thr Val Glu Glu Asn Trp Ala Gly Arg Leu Ala Gly Leu Glu 3315	3320	3325
Pro Ala Glu Arg Gly Gln Val Leu Leu Glu Leu Val Arg Ala Gln Val 3330	3335	3340
Ala Gly Val Leu Gly Tyr Arg Ala Ala His Gln Val Asp Pro Asp Gln 3345	3350	3355 3360
Gly Leu Phe Glu Ile Gly Phe Asp Ser Leu Thr Ala Ile Glu Leu Arg 3365	3370	3375
Asn Arg Leu Arg Ala Arg Thr Glu Arg Lys Ile Ser Pro Gly Val Val 3380	3385	3390
Phe Asp His Pro Thr Pro Ala Leu Leu Ala Ala His Leu Asn Glu Leu 3395	3400	3405

Leu Arg Lys Lys Val  
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<210> 9

<211> 226

<212> PRT

<213> Amycolata autotrophica

<400> 9

Met Ala Ile Pro Tyr Ser Ser Leu Ala Tyr Glu Leu Arg Asp Ala Val  
1 5 10 15

Asn Val Val Asp Leu Asp Glu Asp Asp Val Phe Val Thr Ser Ile Ala  
20 25 30

Glu Gly Gln Gly Gly Ala Cys Tyr His Leu Asn Arg Leu Phe His Arg  
35 40 45

Leu Leu Thr Glu Leu Gly Tyr Asp Val Thr Pro Leu Ala Gly Ser Thr  
50 55 60

Ala Glu Gly Arg Glu Thr Phe Gly Thr Asp Val Glu His Met Phe Asn  
65 70 75 80

Leu Val Thr Leu Asp Gly Ala Asp Trp Leu Val Asp Val Gly Tyr Pro  
85 90 95

Gly Pro Thr Tyr Val Glu Pro Leu Ala Val Ser Pro Ala Val Gln Thr  
100 105 110

Gln Tyr Gly Ser Gln Phe Arg Leu Val Glu Gln Glu Thr Gly Tyr Ala  
115 120 125

Leu Gln Arg Arg Gly Ala Val Thr Arg Trp Ser Val Val Tyr Thr Phe  
130 135 140

Thr Thr Gln Pro Arg Gln Trp Ser Asp Trp Lys Glu Leu Glu Asp Asn  
145 150 155 160

Phe Arg Ala Leu Val Gly Asp Thr Thr Arg Thr Asp Thr Gln Glu Thr  
165 170 175

Leu Cys Gly Arg Ala Phe Ala Asn Gly Gln Val Phe Leu Arg Gln Arg  
180 185 190

Arg Tyr Leu Thr Val Glu Asn Gly Arg Glu Gln Val Arg Thr Ile Thr  
195 200 205

Asp Asp Asp Glu Phe Arg Ala Leu Val Ser Arg Val Leu Ser Gly Asp  
210 215 220

His Gly  
225